FARMERS DIGEST

APRIL, 1947

Volume 10 — **25¢ a Copy**
Number 11 — **$2.50 a Year**

Successful Seeding Tricks	*Successful Farming*	1
Improving Our Market Facilities	*Marketing Activities*	7
A Search for Better Hogs	*Capper's Farmer*	11
New Weapons Stop Rust	*American Agriculturist*	15
"Mail Order" Breeding	*Michigan Farmer*	17
New Methods to Apply Concentrated Spray	*The Southern Planter*	20
A Better Sudan	*The Kansas Farmer*	22
Farming in a Kentucky Cave	*Rural Electrification News*	26
Promised Land for Tenants	*Southern Agriculturist*	28
Feed for the Pregnant Sow	*Hog Breeder*	31
Old Paddle-Tail	*The Cattleman*	34
Slow Fires in the Soil	*Better Crops With Plant Food*	38
Australian Subterranean Clover	*Guernsey Breeders' Journal*	40
Those Three Mineral Musketeers	*N. J. Farm and Garden*	43
Are Hybrid Hogs Coming?	*The Dakota Farmer*	46
Cultivating with Oil	*Farm Journal*	49
Geese on the March	*The Rural New Yorker*	50
Large Laying Pens Save Labor	*Everybody's Poultry Magazine*	55
Before Buying a Farm Check These Points	*Agricultural Situation*	59
Feed the Crops for High Yields	*California Cultivator*	63
Britain's Rural Craftsmen	*John Snowden*	67
Rinderpest — The Cattle Plague	*The Ceylon Daily News*	70
The Greatest Honor in Shepherd Craft	*Sheep Breeder*	73
How to Rid Your Farm of Rats	*Pennsylvania Farmer*	77
Warrin' on Weeds	*Western Farm Life*	81
Lovegrass in the Windy West	*Soil Conservation*	83
For the Farmer's Library		
Index		

LIBRARY
COLLEGE OF AGRICULTURE
UNIVERSITY OF WISCONSIN

The Farmer's Digest

EDITORIAL STAFF:

Editor—L. Bush-Brown Assistant Editor—C. Leavitt Dyer
Business Manager—A. E. Heick
Associate Editors—
John A. Andrew, Jr., James Bush-Brown, Ruth Patrick

ADIVISORY EDITORIAL STAFF:

William A. Albrecht
Chairman, Department of Soils
University of Missouri

John D. Beck
Professor of Veterinary Medicine
University of Pennsylvania

Hugh H. Bennett
Chief, U. S. Soil Conservation Service

D. B. Johnstone-Wallace
Assistant Professor, Department of Agronomy
Cornell University

H. J. Reed
Dean of the College of Agriculture
Director of the Experiment Station
Purdue University

W. T. Spanton
Chief, Agricultural Education Service
U. S. Office of Education

Howard B. Sprague
New Jersey Agricultural Experiment Station

M. L. Wilson
Director of Extension Work
United States Department of Agriculture

The Farmer's Digest
Published Monthly at Ambler, Pennsylvania
by the Farmer's Digest, Inc.

25c a Copy *1 Year $2.50*
2 Years $4.50 *3 Years $6.50*
Foreign Subscriptions $3.00 a Year

Entered as second-class matter at the Post Office at Ambler, Pa., May 5, 1937, under act of March 3, 1879

The Farmer's Digest

Volume 10 April, 1947 Number 11

Successful Seeding Tricks

Condensed from Successful Farming

C. J. Willard

Ohio State University

CLOVER, alfalfa, and other small seeded legumes and grasses are the most important crops in the rotation. These crops alone, of the crops you raise, build up the productivity of your soil and prevent its destruction.

Yet we regularly accept failures to get stands on these soil-building crops. We seldom fail to get stands of corn, wheat, oats, or soybeans; but failures and poor stands of clover are somewhat a matter of course. Can we do anything about it?

We can! Forage-crop failures are due to a wide variety of causes, but care and study can avoid a large share of them. Let's take a good look at how to do it. Let's get good stands *every* time!

Seeding too deep is a prime cause of failure with these small seeds. They should be covered, but only ¼ to ½ inch deep. Any deeper planting than this results in waste of seed. Few plants come from seed planted over an inch deep.

The machinery manufacturers have much yet to do to give us machinery that will plant small farm seeds accurately ¼ to ½ inch deep. So far, much the best implement to use on any recently prepared seedbed is the cultipacker seeder, which puts the seeds at a uniform depth on firm ground. Cultipacking, broadcasting the seed, then cultipacking again, will achieve the same result with more trips over the ground. This method is superior to any drilling, and can be used

Reprinted by permission from Successful Farming, Jan., 1947, Des Moines, Iowa

after small grain is sown, or for seeding forages alone.

So-called "nurse crops" are another basic reason for forage seeding failures. We have called them "nurse crops" for so long that many people think they benefit the seedlings. Actually, the crops in which clovers are sown always compete with, rather than help, the forage seeding; in reality they are "companion crops."

These grain crops rob the forages of water, sunlight, and plant food. With a few exceptions, as where winter grains protect seedlings against freezing, the "protection" nurse crops are supposed to offer is a myth.

Why, then, sow in a companion crop? The most important reason is to get a crop from the land in the seeding year. East of the Missouri River we can usually make successful seedings in grain crops, and the value of the crop is too great to waste.

Moreover, if we sow clover or alfalfa alone in the spring, we often get a companion crop of weeds which does the seedling more harm than the grain would have. On sloping land, grain crops may reduce erosion before the slowly developing forages could withstand it. Winter cereals, as just mentioned, may reduce frost damage.

For these reasons we will continue to make seedings in grain crops. Our problem is to reduce the damage they do and get the most good from them.

The best companion crop depends on the forage being sown and the climate. Clovers are sensitive to summer drouth, and wheat, which comes off early, is a better companion crop than oats. For alfalfa, which suffers particularly from too much shade in the seedling stage, oats and other spring grains are preferable to winter wheat.

Likewise, because they shade young seedlings more in April and early May, winter rye and winter barley are poorer companion crops than winter wheat, except when they are pastured.

Spring barley, which shades the soil less and matures earlier than oats, is a correspondingly better companion crop. For the same reasons, early oats are better than late oats.

Soybeans are not a satisfactory companion crop. Tests show that they let less light reach the soil than any other common crop, and hence are the most efficient *smother* crop for weeds.

Corn also gives severe competition to forages sown in it, and the seedbed is too loose. However, if alfalfa, yellow sweet clover (not white), or other crops adapted to summer seeding are sown in corn early, when it is still being cultivated with the tractor, the proportion of suc-

cessful seedings is nearly equal to those in winter wheat.

Seedings in corn make ragged meadows because of the bare spots necessarily left by the corn hills, but the system is practical in seedings for soil improvement and pasture.

Low rates of seeding the companion crop are often suggested to reduce competition with the forage seedlings. These are important with spring grain, which does not have much opportunity to stool. Here rates ½ to ⅔ of that recommended for grain, or about 6 pecks per acre of oats and 4 or 5 of barley, give less competition and the grain is less likely to lodge. The drier the climate or season, the more important a low rate of seeding the spring small grain becomes.

Another method of reducing small grain competition is to sow the grain in wide rows—14 inches apart or more. In dry climates and seasons this is very valuable. Oklahoma experimenters have found it possible to get stands of sweet clover regularly in wide-planted grain where stands almost always failed in the usual 7-inch rows.

In areas where we have plenty of rainfall, there is no advantage in this system. Indeed, where spring frosts are severe, the wide rows may be a disadvantage.

The use of forage mixtures, especially alfalfa - clover - grass mixtures, instead of a pure seeding, is an important way to have better average stands almost anywhere east of the Missouri River. Alfalfa makes a better stand in dry seasons, red clover in wet. We cannot foretell the season, but by sowing a mixture of both crops, we increase our chances of good legume hay every season.

There are many other hazards to seedings, some involving the companion crop, some not.

Lack of lime and plant food in the soil is a major reason for seeding failures on many soils. Phosphates, especially, stimulate the roots of seedlings, and applications of phosphates for the legume seedings can make the difference between success and failure. Soils regularly phosphated and limed when necessary give the best seedings.

On the other hand, applications of nitrogen carriers to the small-grain companion crops may injure the forages sown in them. Top-dressing winter wheat with nitrogen carriers, for example, is often fatal to clover and alfalfa.

When legumes are sown early in the spring, sudden freezes may reduce the stands. Any temperature lower than 26 degrees will kill most germinating legume seeds. Here winter grain, which prevents local cooling of the soil under its leaves, is a real protection against injury.

Late seeding, of course, avoids

freezing injury, but runs full into other hazards—dry springs and greater competition of the companion crop.

A "split-seeding" furnishes insurance against both hazards. Half the seed sown is broadcast early, and the other half is drilled later, but at the earliest possible date, or broadcast if the weather does not permit drilling. At least a moderately good stand is nearly certain by this method, though it takes more work.

One of the most valuable methods of reducing freezing injury is to apply a light mulch. For seeding in winter grain, this may best be done by applying about four tons of manure per acre to the field any time after seeding. If done before New Year's, it will also reduce winter-killing of the wheat. In Ohio experiments, this top-dressing of wheat in which the new seeding is made has been more profitable than any other use of manure.

Death of the germinating seedlings by drying out is another seeding hazard. Mulches reduce the loss of moisture from the surface and so increase the germination and establishment of small seeds. In spring seedings, early seeding is preferable to late because cool early temperatures do not dry the surface soil as much as the higher temperatures later.

A firm seedbed is very important in meeting the hazard of dry soils at germination. It permits capillary movement of water to the seeds, and establishment of the roots in firm, moist soil. A big advantage of seeding after the cultipacker is that the seeds fall on the firm soil in the bottom of the furrows.

For summer seedings, a seedbed prepared by discing is firmer and permits better establishment than a plowed seedbed. However, where many weeds are present, discing may not be practical.

"Drouth" is commonly given as a reason for failure of legume stands. Usually, however, the basic trouble is that the "nurse crops" have taken the water, leaving none for the legumes. Alfalfa and red clover sown alone on clean land survived even the severe drouths of 1930, 1934, and 1936.

These legume seeds are much too valuable to waste in excessive rates of seeding. Heavy rates are often recommended in a vain attempt to make up for poor seeding conditions by using more seed. The standard rates of seeding are 6 to 8 pounds of red clover or 10 to 12 of alfalfa per acre.

Excellent stands of red clover have been obtained regularly with 4 pounds per acre of red clover or 7 pounds per acre of alfalfa. More seed must be used under poor seeding conditions to allow for the inevitable losses, but if

10 pounds of red clover or 15 pounds of alfalfa per acre will not give a good stand, there is no use throwing away still more seed.

Especially east of the Mississippi River, winter grain often makes a very fast growth in March and April. This may kill clover — and especially alfalfa seedings—by shading before they form more than two leaves.

When, for any reason, wheat makes an exceptionally rapid, early growth, pasturing the wheat for 10 days just before it starts to shoot will often save the legume stand.

Clipping off half the top growth with a mower is also effective. Set the mower as high as possible. The best time to clip lasts only about five days. At the best stage, some four or five inches of leaves will be clipped off, but there will be no sign of heads starting to shoot.

Either pasturing or clipping will reduce the yield of wheat by 10 to 20 percent, or more if done too late. The practice is only recommended in those seasons and on those soils where the wheat promises to lodge later. The clipped wheat has even outyielded the unclipped when the unclipped lodged severely, and the clipped wheat is much more satisfactory to harvest.

A lot of promising forage stands disappear between small grain harvest and hay harvest the following year. A common reason for this is overgrazing of the new meadow, especially in the fall. Young legume plants must have a large top growth in the weeks just before frost, to enable them to store reserve foods in the roots.

This means that new seedings should only be pastured lightly, and *all grazing and clipping should stop six weeks before the first killing frost.*

The coming of the combine has brought another hazard to the forage stands. When the combined straw is left on the field, the new seeding may be badly injured during the fall and winter.

A common mistake in any clipping or cutting of the new seeding is clipping high. Both red clover and alfalfa start new growth from the crown, whatever the height of clipping, so high clipping is of no advantage to them.

Clip or cut them low, always. Weeds, on the other hand, start from buds along the stem, *so the higher we clip, the more the weeds are favored.*

However, *sweet clover* is an exception. *First-year sweet clover should never be clipped.* If you make it into hay in September or earlier, you must realize that its value for soil improvement or

pasture the next year is being cut in two.

Clearly, getting a seeding involves care and attention to a multitude of details. Timing and doing the job exactly right are as important in seeding forages as in any other farm operation. But the rewards are well worth the cost.

Old Crop, New Feed

Southern farmers, rapidly becoming livestock-minded, are finding a valuable "new" feed right in their own backyard. Enough, some authorities estimate, to provide succulent feed for a million dairy cows a year!

It's the lush-growing vine of the sweet potato. Although sweet potatoes are grown on nearly three-quarter million acres of land every year—from Virginia southwest to Oklahoma and Texas—farmers have figured the vines were good only for green manure.

Experiments at various southern experiment stations now show that the vines, especially as silage, are unusually good livestock feed. At the North Carolina station (*Farm Journal*, June, 1946, page 85) sweet potato vine silage equalled corn silage for dairy cattle. Similar results were obtained in Mississippi, comparing vine silage with sorghum silage. The vines have a high carotene content (vitamin A), particularly important in winter feeding.

Once the feeding value of the vines was known, the next job was to develop a machine to harvest them. Although not yet on the market, two have been developed. One designed by USDA engineers, has Texas-type cultivator sweeps attached to the tractor cultivator frame. This cuts the roots, loosens the vines. Then trailing the tractor, is a vine lifter and loader, built much like a hay loader. A trailer, hooked to the lifter-loader completes the line.

The second type consists of vine cutters in front, followed by four concave-spoked wheels set at an angle to the direction of travel. Then specially designed fingers lift the vines from the ground, and move them into a windrow between two hilled rows. Here they may be handled by a forage harvester, loader, or by hand after wilting.

Improving Our Market Facilities

Condensed from Marketing Activities

J. S. Larson

WE ARE still handling farm products with many of the facilities that were in use when the mustache cup was popular and the outcome of battles hinged on cavalry charges. But we are making progress in replacing these outmoded facilities that cut down cash returns to farmers and jack up the prices consumers pay. Even though much of the progress thus far consists of plans and surveys—still it is progress.

What *are* market facilities? They are the big, drab, crowded, clamorous city terminal markets, where there are more fruits, spoiled vegetables, smashed cases, and hand trucks than parking space and suitable refrigeration. They are the weather-beaten shelters along country railroad sidings, where farmers take their crops for assembling into lots sized right for shipment to markets near and far. They are the canneries and other processing plants that dot the big fruit and vegetable production areas, the warehouses equipped to keep food products in condition. They are all those physical means—the good and the not so good, the nearly adequate and the obviously obsolete—by which farm products are assembled, transported, stored, and handled on their way through marketing channels.

Although inadequacies in market facilities are plentiful enough all along the line, the main trouble spots are the city markets. The city wholesale terminal markets supply local retailers and out-of-town buyers. Many of these markets are ancient indeed. They are often located in the older part of the city, where streets are narrow, cobblestoned, and traffic bound and where dray and truck drivers maneuver manfully and interminably in the night time. Parking space is often so scarce that packages of produce have to be trucked several blocks by hand. Yet the market is *there*. For one reason or another it began there, it grew up there, changing little as many of the city's other characteristics changed immensely. To improve and expand it has always been slow, expensive, and very difficult.

During the lifetime of many of these outdated city markets

Reprinted from Marketing Activities, January, 1947, Washington, D. C.

the volume of produce swirling through them has increased enormously. Yet in most cases no provision has ever been made for receiving shipments by rail. Produce arriving in the city must be trucked or carted to the market from various freight stations, the charges for the extra handling being added to the distribution costs. These costs go up another notch if supplemental markets are established in other sections of the city, with consequent duplication of facilities, rehandling between markets.

The U. S. Department of Agriculture has made a survey of major fruit and vegetable terminal markets in 20 cities. These markets serve a metropolitan population of some 40 million. On an average the markets draw supplies from 34 States and handle an annual distribution load of more than 800,000 carloads of fruits and vegetables. The majority of them distribute produce in 4 to 9 States.

The survey showed that extensive improvements were needed in the fruit and vegetable wholesale marketing facilities of 15 of the 20 cities. Thirteen markets lacked direct railroad connections. Eight cities had duplicate markets owned by the railroads. The 20 cities contained 64 separate markets. In 11 cities an excessive amount of produce was handled by hand. In 11 cities the hauling of produce was excessive. Traffic conditions were excessively congested in the markets in 15 cities. And two-thirds of the markets studied had old, poorly designed store buildings.

During the war, when huge quantities of farm products had to be handled and labor was scarce, the inadequacy of our market facilities showed up as never before. Many farm and trade groups, civic organizations, chambers of commerce, and state and city officials realized as never before that our facilities would not advantageously handle distribution for home and foreign markets in peacetime, and began to consider how they might improve their market facilities or build anew.

USDA Activities

The Department of Agriculture has been working on these problems, too. Against the time when war needs would end and the country could turn to the crying needs of peace, it had assembled a group of specialists who know the problems involved in handling, storing, transporting, displaying, and distributing various farm commodities, and in designing market structures, planning layouts, and installing the equipment a modern market requires.

The planning of specific jobs

begins if, after preliminary investigation, the need of improving the existing market or building a new one is determined. The need may range all the way from a mere farmers assembly market with shelter for farmers' and buyers' trucks, to a complete terminal market with facilities that include farmers' and truckers' sheds, dealers' stores, a refrigerated warehouse, and a processing plant.

The department specialists determine the most favorable site for the new market and supply preliminary plans showing the layouts that are possible. Construction and operating costs are estimated. The chances of amortizing the investment in a reasonable time are weighed against income sources that can be counted on. Whether the job to be done is the construction of a new market or improvement of an old one. PMA provides consultation service until the work is completed.

Last year, the service was requested by State and local marketing people in about 25 cities. And although complete studies in each case have not been possible and most projects must wait for building materials, considerable progress has been made already in study, building, and improvement. In one case, for example, after a survey to evaluate market facility requirements, it was found possible to use fair grounds that contained buildings suitable for conversion into market facilities—with savings, as a result, of over $300,000. In one State, marketing people are planning a State-wide system of concentration- and terminal-market facilities, and Department specialists have been cooperating with the local people in getting the studies under way.

Again, in another State, farmers who had to trade in poorly arranged facilities in a congested area wanted a survey made of the marketing facilities for fruits, vegetables, poultry, and eggs. The Department undertook the study after city officials and farm and trade groups had concurred in the request of the State marketing authority. Economic information has been gathered, and sites are being considered.

In one Southern State, Department representatives worked with State representatives to prepare a bill to set up a marketing authority. When the bill was passed, the legislature appropriated $550,000 for a centrally located market.

Marketing Authority Bill

The Department also assisted the National Association of Marketing Officials and representatives of the Council of State Governments and other interested public agencies in drafting a marketing authority bill that

States can use in passing legislation looking to the improvement of market facilities—particularly those that handle perishable commodities such as fruits, vegetables, poultry, and eggs. The bill provides the form for establishing public corporations empowered to build and operate produce markets adapted to State laws and conditions. The permissive laws based on it would not stand in the way of facility improvement through other means.

A public corporation established under such legislation would be managed by a board of directors composed of representatatives of farmers, wholesalers, retailers, and the city where the facility was located. The board could borrow money, buy land, erect necessary buildings and lease them under terms providing for investment liquidation—an assurance of self-supporting operation in the public interest.

And because efficient market facilities *are* in the public interest, the Federal Works Agency has recognized that plans for them are in order in any public building program. For the country as a whole, it is estimated that the sum which could be spent economically in the erection and improvement of such facilities would total more than 100 million dollars.

Development of better market facilities is only a part of the Department's objective of getting increased efficiency into the handling and distribution of farm products. Other parts of this job are programs to obtain adequate storage space for farm products, proper supervision of warehouses, and efficient methods of transportation at reasonable rates.

Under title II of the new Research and Marketing Act, Congress has declared that a "sound, efficient, and privately operated system for distributing and marketing agricultural products is essential to a prosperous agriculture and is indispensable to the maintenance of full employment and to the welfare, prosperity, and health of the Nation." Moreover, it is the declared policy of Congress to promote — through research, study, experimentation, and through cooperation among Federal and State agencies, farm organizations, and private industry—"a scientific approach to the problems of marketing, transportation, and distribution of agricultural products similar to the scientific methods which have been utilized so successfully during the past 84 years in connection with the production of agricultural products."

The Secretary of Agriculture is authorized to make available from funds to be appropriated under the act, for allotment to

State departments of agriculture, State bureaus and departments of markets, State agricultural experiment stations, and other suitable State agencies, such sums as he may consider appropriate for cooperative projects in marketing service and research. Federal contributions are to be matched by the States.

The increasing help given under this act to the planning of satisfactory market facilities—throughout the country and the field of agricultural marketing—should provide members of the trade with better operating conditions, increase the returns to growers, expand the outlets for farm products, reduce the costs of distribution, and give American consumers more food of higher quality at lower prices. The act is a major step toward solving what the President, commenting on it, called our greatest peacetime agricultural problem: the efficient marketing of enough of the right kinds of food and farm products.

A Search for Better Hogs

Condensed from Capper's Farmer

OHIO swine breeders may be the first in the nation to offer boars and gilts certified for performance by an impartial testing agency. The Ohio Swine Improvement Program, launched in 1945, offers opportunity to test stock for prolificacy, nursing ability, livability, effiency in uses of feed, rate of gain, quality of carcass and freedom from defects.

Animals that meet certain standards as breeders will be classified as Proved Sires and Proved Dams. Young stock from tested litters will be designated as Certified, Approved or Commercial, depending on the excellence of litters in which they are farrowed and their own rating as individuals.

The Ohio plan follows closely the pig-testing program in use in Denmark for 40 years to make Landrace the most efficient breed of swine yet developed. Both the Ohio and the Danish plans re-

Reprinted by permission from Capper's Farmer, Feb., 1947, Topeka, Kansas

quire feeding and slaughter tests to determine efficiency in use of feed and carcass quality of a mating before individuals from it may be rated.

Boar and gilt buyers should like the new plan because pedigrees will show the dam's ability as a mother, and her litter's efficiency in turning farm feeds into the kind of pork consumers want.

The new performance testing idea has been taken up enthusiastically in Preble county, Ohio. Owners of Berkshires, Chester Whites, Duroc Jerseys, Hampshires, Herefords, Hutton Blacks, Minnesota No. 1's, Poland Chinas and Spotted Polands have co-operated with one another and with W. H. Bruner, county agent, to make a start in improving their herds.

Since relatively few farmers use purebreds for market hogs, co-operators were permitted to enter cross-bred litters to determine the value of various lines for commercial swine production.

Bruner and W. H. Christman, who cared for the hogs at the Central Feeding Station at Preble county fair grounds, weighed up 42 litters at weaning age and selected 20 from which individuals were chosen for the final feeding test. Of these, 13 were purebred litters, 4 were crossbreds sired by Minnesota No. 1 and Hutton Black boars, and 3 were intercrosses of older breeds.

Two pigs, barrow and gilt, from each selected litter, went on feed at 70 pounds. Each pair of litter mates were put in an individual pen. When they reached slaughter weight, barrows went to Ohio State University's meat laboratory and gilts were returned to the owners.

Eleven pigs were weaned in each of 3 litters selected, and 10 survived in each of 6 other litters. Eight of the remaining litters had 9 pigs apiece and the others 8. Minimum litter weight at 56 days, under the Ohio plan, is 275 pounds for a gilt, 320 pounds for a sow. Seven gilt litters selected averaged 305 pounds, and 13 from sows 363 pounds. That gives the dams of pigs in the test a good score for prolificacy, nursing ability and care in saving pigs.

A comparison of the 3 types of pigs—purebreds, crosses from outbred parentage, and crossbreds from inbred boars—shows that each type was superior to the other two in one or more characteristics. Crossbreds from outbred parent stock averaged 386 pounds a litter at weaning time. That is 52 pounds heavier than purebred litters and 47 pounds heavier than those sired by inbred boars. These pigs had another desirable characteristic: they were not so lardy as the other 2 types.

Purebreds made 100 pounds of

gain on approximately 13 pounds less feed than either type of crossbred, and they produced carcasses that were worth 12 cents a hundredweight more than those of ordinary crossbreds and 20 cents more than carcasses of pigs from inbred boars.

The most striking margin of superiority for one class over the other two was growth rate of litters sired by the No. 1 and Hutton Black boars. Pigs from these sires made average gains of 1.83 pounds a pig daily. The other crossbreds gained 1.33 pounds and purebreds 1.48 pounds a head daily. Their ability for rapid growth made these pigs ready for slaughter at 154.5 days old. Ordinary crossbreds were 24.5 days older when slaughtered and weighed 6 pounds a head less. Purebreds were 15.5 days older at slaughter and were 13 pounds a pig lighter.

This ability to finish 2 to 4 weeks earlier probably means more to a farm hog producer than the extra 8 to 20 cents a hundred difference in carcass value. Ordinarily, when markets are free, pigs that finish early hit a higher market and bring $1 to $2 more a hundred than those sold after big runs start.

The factor for fast growth probably has been fixed in Minnesota No. 1 and Hutton Black by the testing routine used in developing these breeds. They are the product of several generations of the kind of progeny testing that is starting under the Ohio program. They came from mating the best to the best. Carefully kept records, rather than guesswork or chance, determined which animals were used to carry on both lines. This speaks well for such a program, and Ohio growers are likely to be surprised at the speed with which they can improve growth rate once they begin to mate fast-growing lines with other fast-growing lines, as shown by performance records.

All classes in the Preble county test were economical in use of feed. They were finished on concrete and feed requirements of 344 pounds for purebreds and 357 pounds each for both types of crossbreds should have been reduced to about 315 pounds and 327 pounds, respectively, on pasture. It is hard to produce 100 pounds of pork on less feed. Few tests see these marks equaled.

Other phases of the test emphasize the need for such a program to improve breeding stock. The plan calls for litters to be weighed at 150 days as well as at weaning. Eleven purebred litters were weighed at this stage. Eight met or exceeded the weight requirement of 1,350 pounds for Certified stock. The others slightly exceeded the 1,250

pounds set for the Approved classification.

The program sets a minimum carcass length of 28.5 inches. The barrow from one litter that made the weight requirement for Certified stock measured 27.4 inches and that for another 27.6 inches. A maximum of 18 per cent fat trimmings (lard) is set. Both these litters and 4 others heavy enough to meet the standard for Certified animals were too lardy to meet this 18 per cent limit.

Producers of purebreds the last 6 or 7 years have worked rapidly toward short-bodied lardy hogs. Those who buy sires for commercial herds are beginning to complain of short, lardy boars they are shown. Maybe the Ohio program will stop the pendulum before it swings too much farther toward the chuffy type.

Litters sired by Hutton Black and Minnesota No. 1 boars produced carcasses that averaged nearly 2 inches longer than those of purebreds and 2½ inches longer then the other crosses. But these boars, developed for lean carcasses, produced, from sows to which they were mated, pigs that showed too much lard. They outdressed the others by the slimmest of margins, but were beaten by both other classes for percentage of fat trimmings. Not all the difference could be charged to heavier final weight.

The 4 litters that best met standards set up in the Ohio program were purebreds. There were 9 weaned pigs in 3 of them and 10 in the other. All were from aged sows. Weaning weight averaged 32.2 to 40.2 pounds a pig. Three litters were heavy enough at 150 days to meet Certified requirements and the other fell down to the Approved class by a slim margin. The pigs fed out averaged 197 pounds at 162 days. Daily gains were nearly 1.6 pounds a day, and feed requirements of 342 pounds for each hundredweight of gain was lower than requirements for the purebred class as a whole. One of the 4 litters had the highest dressing percentage in the test, but another had the lowest. Carcass length was nearly an inch greater than the average for all purebreds, but about an inch shorter than for pigs from inbred boars. All produced the lean type of carcass required for top pork quality, and the 3 best stood first, second and fourth among the 20 litters in carcass cut-out value.

Tests that will point out breeding stock of this type should do for the hog man what cow testing has done for the dairyman, what trapnesting has done for the egg producer. Swine breeders who test are likely to find their stock as much in demand as proved dairy bulls or R. O. P. chickens.

New Weapons Stop Rust!

Condensed from American Agriculturist

Julian M. Snyder

AGRICULTURAL Engineers at the University of Illinois, Purdue University and other Agricultural Colleges have been running tests of "rust preventives," and they have found several new rustproof compounds.

At the University of Illinois, more than 30 so-called "rust preventives," have been under test on farm machinery and metal strips exposed to the weather for many months. A few of the new compounds are still giving perfect rustproof protection on moldboards after 16 months, according to Professor R. I. Shawl, of the Department of Agricultural Engineering. These compounds are easily removable and have some lubricating qualities.

Professor Shawl states: "Rusting is prevented by these rust preventive compounds because they adhere firmly to the metal surfaces and form an elastic, nonporous film through which moisture and air cannot penetrate. The compounds will prevent rusting even if applied over moist or wet surfaces, they will stop further rusting and loosen up the rust already present."

Further, Professor Shawl found that when these new rustproof compounds were diluted sufficiently with kerosene or white unleaded gasoline to be usable in an ordinary insect spray gun, they gave 4 to 6 months' protection on machinery stored outdoors and more than a year's protection on machinery stored under cover. Agricultural Engineers and farmers say that the "spray method" of rustproofing offers the first practical answer to the problem of preventing rust on those "hard-to-get-at" parts of farm machinery, such as the inside metal work of combines, cutter bar knives and ledger plates, chains, gears, slip clutches, knotters on binders, etc.

Superior to Lubricants

The results of the 16 months' all-weather tests of rust preventives conducted by Agricultural Engineers at the University of Illinois follow:

Crankcase and transmission oil —7 to 30 days' protection.

Axle and pressure gun grease —60 to 90 days' protection.

Five rustproof compounds—276 days' protection.

Reprinted by permission from the American Agriculturist, Nov. 16, 1946, Ithaca, N. Y.

Nine rustproof compounds—365 days' protection or more.

Farmers and Agricultural Engineers reported that of the most annoying and time-wasting results of rust is the trouble farmers run into when they try to tighten or adjust rusty nuts and bolts.

Studies conducted in Iowa show that outside the tractor, truck and windmill, the average piece of farm machinery is used only 11.1 days a year. It has fifty weeks at the mercy of the weather. A survey of 438 Ontario and Chenango County farms in New York State showed that although the machines lasted for years, their average work-life was very short. For example, a corn binder did only 55 10-hour days in its lifetime; a lime-sower 43 days, a dump rake 48 days, a hay tedder only 16 days work. The longest work-life revealed by the survey was the plow with 180 days.

Naturally, the size of the farms and the amount of use given each machine annually had an effect upon the number of work days recorded for each machine. But the important fact revealed by the survey is that farm machinery "wears out," not in proportion to USE, but in proportion to TIME. In other words, IT RUSTS OUT.

A few of the comments on the importance of rustproofing farm machinery by Agricultural Engineers follow:

"Five minutes spent applying an effective rustproof compound to a plow or a disk will save several hours of irritating work getting these tools to scour," points out Professor O. W. Monson, of the Department of Rural Engineering, University of Montana.

"Rust is the greatest enemy of the plow," says Professor Archie Stone, of the New York Institute of Applied Agriculture. "Rusty moldboards mean bad plowing. imperfect seed beds, and scanty yields."

Professor F. W. Duffee, of the University of Wisconsin, points out that a "rusty moldboard, even after it has been cleaned of rust, will pull somewhat harder than a smooth, highly polished moldboard."

"Rust on sprockets, chains, bearings, slip clutches may cause more wear in the first hour of operation than will occur in the whole season," points out Professor B. A. Jennings, of the New York College of Agriculture, Cornell University.

"Rust damages farm machinery having steel sheets. Steel grain drills, steel manure spreaders and combines should not be allowed to rust or the entire machine may have to be scrapped years before its normal life," says Professor Jennings. "Preventing rust is cheaper than replacing parts."

"Mail Order" Breeding

Condensed from The Michigan Farmer

Earl C. Richardson

Extension Editor, Michigan State College

MAIL order breeding is providing more than 1,200 Michigan dairy farmers with high quality proved sire service for more than 70,000 cows at a low cost.

Forty of the best bulls ever housed at one location are in the bull stud at Michigan State College. From this central laboratory, inseminator - managers serving 83 cooperatives throughout lower Michigan receive semen three days each week.

The Michigan Artificial Breeders Cooperative is a federation of local artificial breeding cooperatives, operating in different sections of lower Michigan.

Michigan's grade dairy herds —which account for 97 per cent of the total milk production of the state—are being vastly improved through this program. But so far the ABA program has only scratched the surface, although it has advanced as fast as possible with limited facilities and manpower.

In Michigan there are 150,000 dairy farmers. Ninety-seven per cent of their herds have 15 cows or less. That means the keeping of a privately owned bull on a great majority of dairy farms in Michigan is not a paying proposition.

Of course this does not mean that farmers with purebred herds have no use for their own bull. It is production of purebred stock, in addition to high producing cows, that enters into the picture for this limited number of dairymen of Michigan.

But the 97 per cent of the 1,030,000 cows in Michigan that are grade animals would be producing from 10 to 20 per cent more milk and butterfat today if their sires had been as good quality as the bulls in the ABA stud at East Lansing.

A. C. Baltzer, MSC extension dairy specialist and secretary-treasurer of the Michigan ABA, says the 30 months' operation of the program has proved its worth. While there have been a few dissatisfied users of the service, Baltzer feels most of them have been victims of "bad breaks" rather than inferior service.

Reprinted by permission from the Michigan Farmer, January 18, 1947

Placing before him on his desk in the dairy building at Michigan State College, the records of the sires at the ABA stud, Mr. Baltzer said:

"These bulls are the source of seedstock to assist dairymen in building better producing and more effiicient yielding dairy herds. No one on the farm is more deserving than the hard-working dairyman. I firmly believe this program is the answer to this age-old problem of where do I get my next herd sire?"

The veteran extension dairy specialist pointed out that Michigan has a habit of leading in dairy herd development and improvement. He first pointed to the fact that Michigan started a cow-testing program back 40 years ago in Newyago County. That has developed into the Dairy Herd Improvement Associations which operate in 44 states in the United States.

Michigan established the first cooperative dairy sire association or "bull-ring" in Alpena County in 1909. Michigan was one of the first states to be free from bovine tuberculosis.

He then pointed to the fact that one of the first proved sires ever developed in the United States was located in Michigan. It was Baltzer who found this bull in a very ordinary barn without fancy stalls and equipment, but surrounded by a herd of daughters that yielded well over 500 pounds of butterfat as 2-year-olds.

This, and other discoveries of sires greatly influencing productivity, developed into a national sire proving program. This program, when used in cooperation with cow-testing, enables breeders to get the best inheritance possible in dairy sires.

Today Michigan is one of the leading states in terms of having a cooperative dairy breeding association developed for its own benefit. Dairy leaders from other states and foreign countries have visited the Michigan association and returned to set up programs of identical or similar nature.

Assembling such proved sires and keeping them where they are constantly available is one of the valuable points in favor of establishing an artificial breeding cooperative. It puts the average dairyman, who cannot afford to purchase or keep a proved sire for his small dairy herd, in a position to get service that will help him in his business.

Improves Dairy Industry

Clarence E. Prentice, agricultural agent in Sanilac County, where 6 local associations operate, says:

"The ABA program is a start toward greatly improving the dairy industry in this county. The improvement, through this

means, should be much more rapid than in previous years. The program now reaches approximately 10 per cent of the herds and the dairy cattle in Sanilac County. The possibilities, therefore, are enormous."

The bulls, owned or leased by the cooperative and housed at East Lansing, include 40 sires. Among breeds they are divided as follows: Holstein, 17; Guernsey, 15; Jersey, 5; Red Dane, 3.

How fast can artificial breeding through the cooperative advance in Michigan? Well, Baltzer, who more or less has guided the program through from the beginning, admits there are problems. Finding capable inseminator-managers who will take the short course offered by Michigan State College and return to give good service to the associations is one of the biggest problems. Salaries of these men, however, have been brought up to a point where the job is more attractive.

Another problem is the housing of the bulls at the central station. Labor and material shortages have prevented the construction of the $25,000 barn approved by the legislature 2 years ago. But the associatioin has grown so greatly a $25,000 barn wouldn't begin to house the bulls now being used.

If and when fast air service between Lansing and the upper peninsula is started, there is a possibility of extending the service into the upper peninsula. Tests have shown that the semen must not be in transit more than 28 hours. Present connections prevent mailing of the packages outside the lower peninsula.

Character

". . . When I buy pedigreed cattle I want to know something of the pedigree of the breeder as well as of the cattle."—Gudgell and Simpson.

New Methods to Apply Concentrated Spray

Condensed from The Southern Planter

F. S. Potts

U. S. Bureau of Entomology and Plant Quarantine

THE conventional method of spraying trees with several hundred gallons of coarsely atomized dilute spray per acre is a slow, laborious, and expensive operation. Moreover it requires heavy, expensive high-pressure equipment and large, accessible water supplies. Ordinary dusting is less troublesome, but is effective against fewer pests and results in wastage of materials and poor adherence.

A new method consists of applying a highly concentrated spray mixture in the form of finely atomized droplets (or mist) with a blower at a low gallonage per acre. Low pump pressure and delivery are utilized. Air instead of water is the carrier, thus enabling the fine, smoke-like mist to be carried for long distances.

Mist-blower machines vary in size from 1-horsepower wheelbarrow rigs to 35-horsepower truck outfits. In general, they are much lighter than conventional high-pressure sprayers. A unit consists essentially of engine (except in case of power take-off), pump, blower, tank and spray nozzle placed at the blowers discharge outlet.

One 25-horsepower blower delivers 8,730 cubic feet per minute at 124 miles per hour through a 12-inch diameter outlet. Spray mixtures may be broken up very finely by the air blast, or partly by an atomizing nozzle and partly by an air blast of 100 to 250 miles per hour. The droplets are so small that 1 gallon applied by the new method is equal to 500 to 1,000 gallons of dilute spray applied by the conventional method.

A special nozzle attachment has been developed for the application of mechanically atomized aerosols with these machines. A dust hopper and feed mechanism may be provided for applying "dry" dusts. When desired, the simultaneous application and wetting of dust with adhesive spray mist will improve the deposit and adherence of the dust on the foliage. Essentially, the new device may be used as an all-purpose applicator for dispersing concentrated spray, dust, spray-dust, or aerosol. It will apply any insecticide, fungicide, herbicide, hormone, or combination. Ex-

Reprinted by permission The Southern Planter, Feb., 1947, Richmond, Virginia

amples of high pesticide concentration in the spray formula are illustrated by mixtures containing as much as 3 pounds of DDT or 6 pounds of lead arsenate, cryolite, or wettable sulphur per gallon of liquid.

Among the 50 or more pests that have been effectively controlled are the gypsy moth, browntail moth, white pine weevil, pine saw flies, Japanese beetle, pear psylla, pea aphid, potato leafhopper, potato flea beetle, flies, and mosquitoes.

The 25-horsepower mist-blower can dispense sprays to the tops of the tallest pecan, park and shade trees, or laterally for a distance of 75 feet against a five-mile wind or 200 feet in calm air. Gypsy moth, sawfly and mosquito populations have been knocked down or wiped out 650 to 1,500 feet from the machine by drifting the mist cloud with the wind. Certain other pests, such as some disease organisms, leaf miners and small fixed sucking forms, can be best controlled by applications from opposite sides of the plants to insure a heavy deposit underneath the foliage as well as on the insect. Width of effective swath in this kind of treatment is from 50 to 100 feet with the large machine and 10 to 15 feet with the wheelbarrow unit.

Economy and speed of operation may be illustrated as follows: A 300-gallon tank of dilute spray will cover 10 large shade trees at 30 gallons per tree, or ½ acre of orchard or woodland, while a 300-gallon tank of concentrated spray will cover 1,200 to 2,400 large shade trees or 300 acres of forest plantations. About 10 acres of woodland can be sprayed per 8-hour day with dilute spray, whereas 20 acres were treated in 1 hour with concentrated spray at 5 per cent of the cost of the dilute-spray method. A mist-blower treated 50 acres of potatoes in 2 hours. The ordinary 18-hole golf course can be covered in half a day to control Japanese beetles and mosquitoes. As much as 200 acres of city property have been treated per day for fly, mosquito and Japanese beetle control at a cost of 60 cents to $1.50 per acre ($2.50 to $6.00 per city block).

Concentrated sprays applied by this method will not leave an objectionable deposit on the surfaces of buildings, houses and automobiles.

This method of spray application is being developed by the writer in cooperation with R. B. Friend, of the Connecticut Agricultural Experiment Station. Admittedly the method is still in the developmental stage, but it is expected that efficient machines in all sizes will soon be available commercially.

A Better Sudan

Condensed from Kansas Farmer

Kling L. Anderson

Kansas State College

SUDAN grass has been grown for hay and pasture in the United States since its introduction from Africa in 1909. But only in the last few years have major improvements been made in it by plant breeders. One of the most important of these improvements has been the recent development of sweet Sudan at the Texas Agricultural Experiment Station, from a cross involving common Sudan and Leoti red, a sweet sorghum. This new variety has at least 3 important advantages over its common parent: Its sweet, juicy stalk, which gives it a high degree of palatability; its generous yield of seed; and the distinctive, reddish-tan color of the seed, which makes it easily distinguishable from all common varieties of Sudan grass.

Palatability of sweet Sudan has been one of the major factors in its rapid spread. Trials on farms and in various grazing experiments all have indicated that livestock show a marked preference for sweet Sudan over the common strains. Where they have free choice, livestock will graze on the sweet variety almost to the exclusion of the common ones.

The college dairy cattle at Manhattan have been no exception. In 1945 and 1946 the dairy department Sudan grass pastures have been sown to 6 varieties. Both years the cows have spent more time on sweet than on any other variety, and have grazed it more closely and more uniformly. The stalks, as well as the leaves, are palatable and this overcomes to a large degree the irritating habit cattle have of stripping off the leaves and wasting the stalks.

The importance of palatability doubtless can be overrated, however, for where animals do not have free choice of varieties but are forced to graze on a single strain, they fare well and make good use if it. Sweet clover, for instance, is not considered highly palatable. Animals not accustomed to it may refuse to take it readily at first, but once they learn to take it they thrive on it. Major differences in palatability are important, because a crop may be so unpalatable as to be

Reprinted by permission from the Kansas Farmer, Dec. 7, 1946, Topeka, Kansas

refused entirely. Or it may be taken so sparingly as to cause reductions in gains or in milk production. The common varieties of Sudan grass do not fall into this category, although they are somewhat less palatable than the new sweet strain.

The high yields of seed will make the crop attractive to the seed producer. Not only will he benefit by the increased yields but will have more seed available for pasture plantings. Thus, the one who ultimately benefits will be the livestock producer. Large yields make for cheaper seed production, and, eventually, lower costs of livestock production. The great demand for seed of this crop far exceeds the supply, and seed is still difficult to obtain.

In addition to this advantage of high-seed yields, sweet Sudan produces seed that is distinctive in appearance, resembling its Leoti red parent in color. No other Sudan variety resembles it, and there need therefore be no mistakes in obtaining the true variety if this one is being purchased. Johnson grass seed, for instance, could easily be detected in it by the seed analyst, as could seed of the common Sudan varieties.

Still another advantage of sweet Sudan grass is the fact that it is somewhat more resistant to the leaf diseases than are the common strains. It was developed in an area of low relative humidity, where leaf diseases are not severe, so this factor probably was not a major one in its selection. But some of the leaf-disease resistance of its Leoti red parent has been retained. This is not an important factor in the drier parts of Kansas because the leaf diseases are not troublesome there. But in the eastern one-third of the state they may cause severe losses of leaves, especially in wet years. Sweet Sudan will not withstand severe attacks of leaf diseases but is more resistant than the common strains.

Sweet Sudan grass is moderately resistant to chinch bugs and stands up slightly better than common Sudan in mild to moderate infestations. But chinch bugs in large numbers can destroy it, too. Its resistance to both chinch bugs and leaf diseases can be improved by further breeding and selection.

Yields of forage by sweet Sudan have been entirely satisfactory. In clipping trials at the Kansas Agricultural Experiment Station they have not differed greatly from those of the common varieties, except that when leaf diseases have appeared then the sweet strain has continued to produce somewhat longer than common Sudan before the growth was halted by the diseases.

The problem of prussic-acid poisoning has not yet been fully

worked out in sweet Sudan. Sudan varieties in general are less likely to be poisonous than are the other sorghums. Yet in states north of Kansas even the common Sudan varieties sometimes may be dangerous. No authentic cases of poisoning from Kansas certified Sudan have been reported in this state; yet chemical analyses show that Wheeler Sudan, the Kansas strain, is not among the lowest of the Sudans in percentage of prussic acid. The same may be said of sweet Sudan. Chemical tests show it to be fairly high in prussic acid, yet so far there have been no reported losses from poisoning by this variety in Kansas.

There still is much to be learned about prussic-acid poisoning by Sudan and other sorghums. It appears that the danger generally is greater in the northern states and less in the south.

A number of experiment stations are attempting to improve Sudan grass by breeding. The Wisconsin station has developed strains extremely low in prussic acid, as has the South Dakota station. Nebraska workers, too, are studying this problem. At Tifton, Ga., there was recently released a new strain, Tift, resulting from a cross of common Sudan x Leoti red, similar to the one that has given us sweet Sudan. This strain is extremely resistant to the leaf diseases and has made growing Sudan possible in the humid southeast, where common Sudan varieties were defoliated by these diseases almost every year. Tift lacks the palatability and the distinctive seed color of sweet, however. It has not been taken as readily by livestock as the common varieties in grazing tests at Manhattan.

Some years ago the California station released a selected strain of common Sudan known as California 23 because 23 selected lines were combined into the strain. It has not been much more satisfactory than the Kansas strain in this state, because it lacks resistance to both chinch bugs and leaf diseases. It is quite similar to Wheeler Sudan (Kansas certified) in every respect.

Sudan grass also is being studied at the Kansas Agricultural Experiment Station. A strain of common Sudan made up of 5 selected lines showing resistance to both chinch bugs and leaf diseases is being increased for testing. This strain has shown the ability to remain green and vigorous long after Kansas certified Sudan has been defoliated by diseases and chinch bugs. A number of selections from crosses involving Sudan grass and Leoti red sorghum, which are being tested for leaf-disease and chinch-bug resistance, show marked im-

provement over the common varieties. In addition they are leafier and have sweet, juicy stalks.

Another cross showing some promise is one of Sudan grass by Johnson grass. The Kansas selections are out of a cross made at the Cornell station by Dr. L. F. Randolph. This cross is not easily made, since Johnson grass has 20 pairs of chromosomes and Sudan only 10. But Doctor Randolph was able to double the chromosome number in some of his Sudan grass plants by the use of the drug colchicine, and could then cross these with Johnson grass. The resulting progeny have been selected for a number of generations in Kansas and types with a high degree of resistance to both chinch bugs and leaf diseases have been obtained. Many of the plants have short root stocks resembling those of Johnson grass; but all have failed to survive the winters at Manhattan, even when protected by a heavy cover of straw. This lack of winter hardiness eleminates the possibility of their becoming a weed pest.

A selected strain of this material has been increased for grazing tests. Preliminary grazing tests indicate that it yields well but is slightly less palatable than common Sudan grass. Extremely vigorous, leafy types are being obtained among more recent selections in this material, but these later selections have not yet been tested for palatability.

A group of crosses of Sudan grass by atlas sorgo have been studied for a number of years. Most of these have been coarse and stemmy and, unfortunately, the finer-stemmed ones have lacked leaf-disease resistance.

Seeding vigor is another factor being given considerable study. Neither Tift nor sweet produce seedlings as vigorous as those of the common Sudan varieties. This factor is of especial importance in the drier areas, where it is necessary that the crop become established as quickly as possible and extend its roots deeply before the surface soil can become dry. Seedling vigor also is important during chinch-bug manifestations because the more vigorous seedlings are less quickly destroyed by migrating bugs. Vigorous seedlings grow out of the seedling stage more quickly and produce shade, which tends to discourage chinch bugs. Thus, vigor can, in a sense, be a factor in insect resistance. New strains must have sufficient seedling vigor or they never can have widespread use.

Improved forage qualities, yields, prussic acid content, seed production, and seedling vigor, all are being given attention.

Farming in a Kentucky Cave

Condensed from Rural Electrification News

In a cave 75 feet below Hart County in central Kentucky, John Carrar raises profitable crops of mushrooms. He harvests and expresses to Louisville and Chicago an average of 75 pounds of mushrooms per day, receiving about 60 cents per pound for his product. Electricity supplied by the Farmers Rural Electric Cooperative Corp., at nearby Glasgow, is an important factor in his production program.

Carrar, now 78, first learned about raising mushrooms in his native France nearly 50 years ago. He grew mushrooms there in underground cellars from 60 to 160 feet below the streets of Paris. After he came to this country, he set up, in California, his own laboratories for producing mushroom spawn.

One day a friend wrote him about a cave 6 miles south of Upton, Ky., and Carrar once more became interested in mushroom-growing. He took leave of absence from his laboratory and came East to investigate the cave's possibilities. He checked its temperature and humidity and made certain that acid-free soil was available for covering the mushroom beds. Even water from the spring on the hill atop the cave was tested to make sure it contained no acid.

Equally important in Carrar's estimation, was the need for electric service. His plans called for electricity, not only for lights but also for a thermostatically controlled stoker and blower fan, to regulate the cave's temperature and humidity.

It was hard work preparing the cave. Water from the spring overhead had to be piped down to water the beds, the cave's entrance had to be made tight, most of the cave had to be wired and lighted, and the furnace and blower fan, plus 800 feet of 10-inch ducts for distributing warm air, had to be installed. Once the heating system was in, says Carrar, it took 3 weeks to dry out the cave. But early in November, 1945, the first beds were ready for planting and the first mushrooms were harvested the following January. The beds have been producing continuously since then.

Controlling temperature and humidity in the cave is a ticklish job. A temperature of 80 degrees is required at planting time. Then for the following 15 days, 70 de-

Reprinted from Rural Electrification News, Jan., 1947, Washington, D. C.

grees is desirable, after which the temperature is kept between 55 and 60. The blower is installed so that it may be used to draw in warm air from outside the cave during hot weather without using the furnace.

Most mushrooms raised in the United States come from mushroom houses, says Carrar, where they are raised in tiers of flat beds one above the other. The Carrar cave houses 20,000 square feet of mushroom beds, of which an area of 4,000 square feet begins bearing every 3 months. A bed bears itself out in about 4 weeks.

"Here in the cave," says Carrar, "the mushrooms grow a little more slowly, but that's all right. I have plenty of space for beds and I have not had to spend money building a mushroom house. I raise good mushrooms, too. They weigh from a fourth to a half-pound each. A few weeks ago I picked one that weighed a full pound." Carrar expects to return to his California laboratory, leaving an assistant in charge of his Kentucky cave, where electricity can be counted on to perform automatically many essential tasks. His know-how, the natural resources of the county, plus the advantages of electricity will have brought another and profitable industry to Kentucky.

Corn Borer

The number of borer larvae in a cornfield can be reduced about 3 per cent for every day that planting is delayed. One Ohio field, planted may 7, yielded about 20 bushels of corn per acre and had from 18 to 20 borers in each stalk. A field next to it and planted May 21 on equally productive soil, produced 100 bushels per acre and carried 2 or 3 borers per stalk. The corn-borer moth selects early corn for egg laying; a higher percentage of the larvae hatch and survive than when eggs are laid on corn planted later.

Successful Farming

Promised Land for Tenants

Condensed from Southern Agriculturist

Harold Severson

TEN years ago a young North Carolina lawyer named Tom Pearsall was handed a 22,000-acre plantation and told, "Here, let's see you run this place profitably." He's done that very thing—and more, too The big, sprawling M. C. Braswell Company plantation at Battleboro, near Rocky Mount, not only is operating successfully, but it's become practically a Promised Land for sharecroppers. Pearsall inaugurated improved landlord-tenant relations which are paying off in the form of larger crop yields, better cash incomes and contented farm families.

Tom Pearsall was anything but a know-it-all when he took over the plantation in 1935. Quite frankly, he knew nothing about farm management. He admitted it. Recently graduated from the University of North Carolina, he was practicing law in Rocky Mount. Then he was drafted for the job of managing the plantation in connection with settling up the M. C. Braswell estate. The owners were all members of Mrs. Pearsall's family.

The best equipment this solidly built six-footer had for his new responsibilities was an intelligent ignorance. Since he knew so little about the sharecropper system, he began studying it from all angles. He soon decided it needed revision. Drastic revision. Sharecropping was a necessary institution on the plantation, he learned. The greater part of the field work centered around cotton, tobacco and peanuts, which required much hand work.

Pearsall, a practical man, decided there would be no point in abolishing the old system, though it was good for neither owners nor tenants. Nearly one out of every four tenants was quitting the plantation each year. Pearsall figured it was costing him $200 every time a tenant moved away. In addition, it was upsetting the farming program. A dissatisfied worker and his family didn't feel like fixing fences, or making a garden, or keeping the house in a good state of repair.

Somebody pointed out to Pearsall that he couldn't expect a good tenant to move into a run-down house, or to farm an eroded worn-out piece of land. Pearsall agreed.

Reprinted by permission from the Southern Agriculturist, May, 1946, Nashville, Tenn.

Instead of abolishing the share-cropper system, he decided to revamp it and add some refinements of his own. His first move was to gain the full confidence of his farmers.

"Once you win their trust and confidence," he commented, "you've got them in a frame of mind where they're ready to follow some good advice."

Making his tenants happy wasn't a hard job. Pearsall wanted to reduce the turnover in farm help by keeping them satisfied. He believed that was an important move toward keeping them on the plantation.

One of his first steps in that direction was hiring farm managers. These are agricultural college graduates who know farm management. They also have the knack of instructing share-croppers. Their services are available without extra cost.

Pearsall had a practical reason for this move.

"If I can make a good farmer out of a tenant, I can make more money from his crop," he emphasized. "The tenant also gains."

This venture has paid dividends from the start. The outbreak of World War II found tenants on the Braswell plantation staying on the place instead of moving to large cities for well-paid jobs.

"We haven't had an acre to lay out in the past five years," he told me. This is a mighty good record in comparison with some other places.

Fair treatment has kept the old tenants at home. New tenants come to Battleboro because they believe they can make money, save it and eventually get ahead instead of being constantly in debt. No new tenant is allowed to move there until his past record has been carefully checked. Pearsall wants only hard working, thrifty and honest tenants on his place.

Pearsall is probably the only man in the South who has no desire to make money out of the commissary. He makes it clear that he's primarily in the farming business—not in the banking or mercantile field. He urges his tenants to buy only useful items instead of squandering their funds.

"Save your money," he advises them. "Don't spend your money on foolish items. Every time you buy from me on credit, I make money and you lose it. Don't run up a big credit account."

Highlights of the year is the annual plantation barbecue. It's an all-day affair which gets under way about 9 o'clock on a September morning. Usually about 20 pigs are barbecued and big pots are filled with Brunswick stew and potatoes. At noon there's a

big feast for the thousand men, women and children, complete with lemonade, barbecued pork and Brunswick stew. Then comes the big moment when prizes are awarded to tenants who have done the best job of farming or home-making.

Because of the size and complexity of the Braswell plantation (it sprawls over four counties in eastern North Carolina), it's divided into farms. Each farm has an overseer who works with scores of tenants. The overseer who makes the best showing is also rewarded. Pearsall points out that this gives the overseer an incentive for being loyal to his tenants and the tenants an interest in helping the overseer win the award. At the barbecue, each overseer comes up and tells why the winning families have won prizes. Crisp dollar bills are then distributed to each member of the family—not merely to the head.

The Braswell plantation is one of the few big places to hire a full-time worker to teach the women and children how to live better at home. Mr. Pearsall hired a trained home economist for this work. The way she's succeeded in inspiring the women and youngsters to raise gardens, fix up their homes and preserve more food is an inspiration in itself. A typical day finds Miss Watson busy supervising women on a sewing project, making plans for canning food and giving first-aid to a colored boy. She teaches the women how to can, sew, prepare nutritious meals and make improvements in home sanitation.

Pearsall's influence is evident in the appearance of each home. Flower beds are numerous. The houses are much better furnished than formerly and the stocks of home preserved foods are becoming larger each year. Nearly every tenant has chickens, hogs, and a milk cow. Many of the houses are being wired. In addition, Pearsall is planning a low-cost tenant house with all modern conveniences. A skilled architect is working on the problem.

When he launched his program eight years ago, Pearsall made a determined bid for the trust and confidence of his tenants, a large percentage of whom are colored. How well he has succeeded is shown at the annual barbecue. There he speaks (he calls it "preaching") on practical aspects of farm management, urges tenants to co-operate with the overseer, and to accept the advice of his specialists. They listen—not because he's the "boss man," but because they like and respect him. It's also shown by the fact that the annual turnover of tenants has slumped from nearly 25 per cent to less than five per cent. Tobacco yields have climbed and so have cotton, corn and peanuts.

They're making unexpected use of the canning plant he established. There's no charge for using the canning equipment.

The chances are that Tom Pearsall will not reform the sharecropping system, but the chances are also that he will continue to stir up interest and thus get some thinking done along that line. After all, if one plantation owner succeeds with his newfangled program, some others are bound to see the same light.

Feed for the Pregnant Sow

Condensed from Hog Breeder

E. L. Quaife

Animal Husbandman, Iowa State College, Ames, Iowa

THE pregnant gilt may well gain 1 to 1½ pounds per day during the pregancy period of 112 to 115 days," says Mr. E. L. Quaife, Iowa's outstanding animal husbandman, in the Ames published booklet on "The Brood Sow and Litter."

"The amount the tried sow gains will depend much upon her condition at breeding time. Keep the sow from getting too fat by exercise and through the use of protein and bulkier feeds.

"Gilts will need from 1½ to 2 pounds of grain per hundred weight a day while older sows may do with 1¼ to 1¾ pounds per hundredweight.

"During the winter months 1 to 2 pounds of whole dry oats per sow, hand-fed, with enough corn to keep the sow in good gaining condition, form the basis of a satisfactory pregnant sow ration. Give sows access to mineral mixture and to all the good legume hay, such as alfalfa, red clover or soybean, she cares to eat. Feed to ⅓ pound of some good protein supplement or ½ gallon of skim milk to the gilt each day. The protein supplement might be limited to the second half of the pregnancy.

"Coarsely ground barley or wheat may replace part or all of the corn in the brood sow ration

Reprinted by permission from the Hog Breeder, Jan. 15, 1947, Chicago, Illinois

in localities where these grains are comparable in price with corn. Avoid the use of rye in gestation rations.

"When on good pasture, the pregnant sow will need only enough grain to make a satisfactory gain. During the latter half of the pregnancy period 1/5 pound of protein supplement daily per sow.

"If slopping is practiced during winter, 950 pounds ground oats, 950 pounds of ground wheat or middlings and 100 pounds protein supplement make an excellent mixture when corn is hand-fed in addition. About 3 pounds or one-half the daily feed should be the grain in slop and the other half corn.

"Pregnant sows may be self-fed with a saving of the detailed labor required in hand-feeding; the sows can eat according to their needs; more legume hay will be consumed. Self-feeding involves grinding of part or all of the feeds, and unless the ration is made bulky, the sows may become too fat.

"For dry lot or winter feeding, a mixture made up of ⅓ ground shelled corn, ⅓ ground oats and ⅓ coarsely ground alfalfa with 100 pounds of protein supplement added to each ton of the mixture has been satisfactory when self-fed to both gilts and older sows. Minerals may be added to this mixture at the rate of 20 pounds of minerals to the ton of feed, or they may be self-fed.

"In making up the grain and roughage mixture, different proportions can be used, depending upon the availability of various feeds and the age and condition of the sows. Some swine producers have fed up to 50 percent of the mixture in the form of alfalfa to old sows. The protein supplement may be left out until the second half of the period for tried sows. Skim milk can also be used to replace the other protein feeds.

"A second procedure which does not involve grinding the corn is to use a mixture of 600 pounds ground alfalfa, 600 pounds ground oats and 100 pounds of protein feed. The ear corn can be fed separately at some distance from the sleeping quarters and the amount fed should be governed by the condition of the sows.

"To make the sows exercise, the self-feeders should be set 15 to 20 rods from the sleeping quarters. The waterers should be near the sleeping quarters so the sows will drink both going and coming from the feeder. It is very essential in self-feeding bulky dry feeds that the sows get sufficient water. The sows should be taken away from the self-feeders 2 or 3 days prior to farrowing. Sows and gilts should be

fed separately; otherwise, the old sows might fight the gilts from the feeders.

"On pasture, either whole oats may be self-fed or a mixture of ⅔ ground oats and ⅓ ground corn or wheat may be used, with 5 pounds protein supplement to each 100 pounds of gain.

"Weakness of the back and the hind legs of brood sows suckling pigs sometimes occurs when the litters are large. This trouble may be caused by mineral, protein or vitamin deficiency in the feed. To prevent this trouble, provide plenty of these minerals in the ration. Experience shows that feeding all the alfalfa hay sows will eat helps prevent paralysis of the hindquarters. If such trouble has occurred previously on the farm, it is a good plan to force-feed minerals. Use a simple mineral mixture at the rate of 4 to 5 pounds with each 100 pounds of protein supplement. Do not deprive the sow of minerals.

"Legume hays, such as alfalfa, clover and soybean contain high quality protein and mineral elements such as calcium and phosphorus. They are also rich in vitamins.

"Roughage distends the digestive apparatus and develops roomier brood sows. In localities where alfalfa is plentiful, it may make up 40 percent of the total feed consumed by the pregnant sow. When this much alfalfa is fed, it should be ground. Smaller amounts, such as ½ to 1 pound a day, may be fed in the form of hay in racks or in the nest.

"Allowing brood sows to follow cattle is a common practice but none too safe. The danger lies in sows getting bunted or kicked or in wallowing in deep mud. These hazards can be lessened somewhat by removing the sows 3 or 4 weeks before farrowing. Even though protein supplement is fed to the cattle, additional grain and protein supplement should be fed by hand to the sows during the latter half of the pregnancy period.

Exercise is best obtained by allowing pregnant sows to forage in the stalk fields or in a field where corn and soybeans have been hogged-down, or by scattering their feed some distance from the sleeping quarters."

Old Paddle-Tail

Condensed from The Cattleman

Robert M. Hyatt

IN THE northern part of the world where the winters are severe, the beaver builds substantial mansions. As you travel south, where less shelter is required, you'll find beaver houses mere shacks. A busy, wood-cutting family man in the cold country, Old Paddle-tail, is a laggard in balmy climes.

You probably haven't given much thought to the beaver. Chances are if you came face to face with him you wouldn't know him.

In the Old West beaver skins were used for money, being exchanged for all sorts of commodities. Because of his glossy coat, which furnished the substance for making stovepipe hats, beaver trappers made long explorations, fought Indians, amassed fortunes and founded empires. Quest of the beaver pelt did much to help colonize the great wastelands.

But Old Paddle-tail has contributed far more than rakish top hats to America's heritage. It is now known that once much of the United States was overrun by this valuable animal; that he has been one of the most important natural agents holding back soil and water. It has been estimated that before settlement by white men, the dams of some 60 million beaver on the headwaters of streams held back spring floods and maintained flow during dry seasons. Much of the restocking of beaver in denuded areas has been in connection with programs to improve water flow and control erosion.

It would be difficult to find a more significant fellow in California history from 1826 to 1846. He lured the great explorers who laid the framework that opened California to settlement and snatched it from Mexico, keeping Britain from grabbing the state.

You won't find many beavers in California today. But about 1840, when trappers were taking another race of California beaver, the Golden beaver, by the thousands along the San Joaquin and Sacramento Rivers, no other spot on the continent contained so many beavers. The Golden beaver was the largest and fattest trappers had ever seen. We now know that beaver, unlike most animals, continue to grow

Reprinted by permission from The Cattleman, Feb., 1947, Fort Worth, Texas

throughout life, and that the size of this race was simply the result of a long period of undisturbed growth.

By 1846, beavers were all but gone from the state. A year before, payment for supplies in beaver skins had ceased. The Hudson's Bay Company withdrew its men, and the hunters themselves soon joined the hunt for another form of gold, that which Sutter had discovered in the northern foothills.

More valuable to the Indians than his fur, was the beaver's tail, which is an extraordinary thing, exceedingly broad and covered with a bony integument resembling scales. A large beaver is about two feet long, with a tail half that, which was considered a gastronomic delicacy by the Indians.

When the Pilgrims landed at Plymouth Rock, they were met by the beaver whose temperament and manner of life made him an easy prey for these voracious early Americans. With their crude blunderbusses they potted him right and left, using his thick fur for blankets and robes.

This wholesale slaughter must have been a shock to the gentle beaver. He evidently didn't mind a few forays by Indian tribes, with whom he had lived uncounted centuries. Indians, unlike whites, never killed except for food and shelter.

Alarm rang through the beaver ranks, and soon he was waddling away from his old haunts. Today few beavers are to be found south of the rivers that flow into Hudson's Bay, except in a few scattered remote places like the forests of Maine and the Lake Superior region, and the northern parts of the Rocky Mountains. A few survive, nevertheless, in the wild ranges of the southern Alleghenies and along the borders of Mexico in Texas.

Old Paddle-tail is a choosy diner. He likes to gnaw the bark of hardwood trees, such as the maple, linden, poplar, birch and the like. He never eats the bark of coniferous trees, and you'll never find him living in forests composed entirely of pine trees, nor in treeless country.

He is a cagey builder. With his fat wife, he will wander away from the colony and seek a new place in which to start his family. He will choose a sluggish stream in the woods, and there dig a burrow in the bank, below the surface of the water. The tunnel will lead upward into the earth above the high water mark, from the main boudoir, which may be a room 8 or 10 feet across. Often he will dig an air outlet down through this room, heaping a pile of brush over it for concealment from predatory beasts.

Beaver dams are works of engineering genius. When choosing a stream for a burrow, they find one in which the water level will never fall so low in summer as to expose the entrance of the burrow; moreover, it is necessary that this water should be so deep that in winter the ice will not freeze to the bottom, which would hinder passage back and forth.

In order to maintain this requisite level of water, Old Paddletail will throw a dam across the stream below his settlement, holding the water back to a sufficient height. He does this by placing a number of sticks lengthwise of the current in the middle of the creek, holding them down with piles of mud and rocks, molding this dam expertly with his dexterous front feet.

He uses larger and larger poles in this dam building, doing all his timber cutting with his long, powerful front teeth. Standing on his hind legs, he gnaws round and round the stem of a tree until it falls; he has been known to cut down trees 18 inches in diameter.

As the beaver family increases and the young grow up, they settle in the immediate neighborhood until a considerable colony will have arisen. During all this time work progresses on the dam, each beaver gathering drift wood, branches and logs from the shores, stones, mud and everything available for the purpose. The work is carried on only at night, especially on moonlit nights. There is no superintendence, but each beaver is possessed with an instinct for industry and does what he deems best.

Sometimes in low swampy regions these dams will stretch for several hundred feet and hold back a large pond. The area may boast a score or more of conical beaver houses, solidly constructed and when frozen in winter so thick that no animal short of a bear can break in.

Like squirrels, beavers store winter food in the form of bark. They get this by cutting down trees near the water's edge, and gnawing them into lengths small enough to be rolled or dragged into the water. These pieces are floated away and sunk at the doors of their houses, where they are weighted, or stuck into the mud to prevent their floating away, until a sufficient pile is secured. Piece by piece this store is taken into the house during the winter, and, the bark having been eaten off, the sticks are tossed out to be used in the spring as material for repairing and extending the dam.

When a colony of beavers has exhausted the supply of trees bearing edible bark within reach of the shore of their stream, they begin digging canals. They run these far back into the woods on

each side of their dam, thus enabling them to reach more trees. In some of the swampy forests about the headwaters of the Mississippi, these canals have been known to extend several hundred feet, and in such places colonies of beavers have maintained an existence of more than 200 years. These canals are kept free of weeds and of proper depth to form safe avenues of industry and escape for the entire community.

In many states during the last decade projects have been undertaken to restore the beaver, but it is doubtful that their numbers will ever again permit trapping.

An odd thing about the beaver is a substance called *castoreum* which he lugs around in two glandular pouches. It is a secretion having a powerful, pungent odor and was formerly in demand for medicinal purposes. At present its only use is as a scent-bait for traps.

Another thing about which there is much argument among old-timers: Does the beaver slap the water with his broad tail as a warning to others of his kind that danger threatens, or does he make this loud, cracking report only in spirit of play? That he produces this striking sound is well known. But why . . . well, it's a good point for discussion anyway.

Grapes

The yield of Campbell's Early has been increased 21 pounds per vine—or more than 3 tons an acre—by giving it a root system more vigorous than its own. Moore's Early gained nearly 8 pounds per vine in fruit yield on an improved root stock. Similar experiences have been reported from the State of Missouri with Delaware, Winchell, and Concord. No effect on quality or time of ripening was noted. Root stocks found outstanding are Constantia, U. S. 125-I, and U. S. 3309. *Successful Farming*

Slow Fires in the Soil

Condensed from Better Crops With Plant Food

G. D. Scarseth

Director of Research, American Farm Research Association, Lafayette, Indiana

ORGANIC matter is the firewood in the soil. Too often we smother this fire and then we are in for trouble. Let's have lots of fuel in the soil, but if it is to do the most good it must burn brightly when we need it.

On a cold winter evening it is comfortable to hear the old living-room heater roar as the wood is changed to gases that burn. The destruction of the organic matter of the wood goes on at such a fast rate that the heat released becomes intense.

A hard run for a stray calf makes the sweat pour because the body must "burn up" some food fast enough to supply the necessary power. For a noon nap, some covers feel comfortable because, thus relaxed, not enough energy is used to keep the resting body warm, although the room is at a desirable temperature when moving about .

A snake or alligator moves so seldom that it can get along on a meal only every few weeks or months and need not burn enough fuel for energy to even warm its body.

When silage or sauerkraut is started the bacteria and yeasts find the sugars in the mass of material such an abundant supply of food, that they multiply so rapidly the chemical reactions of this first stage of decomposition give off more heat than is conducted away, with the result that the silage or kraut becomes warm. Wet hay may decompose so fast, because of microbial action, that the heat of decomposition may accumulate sufficiently to ignite the hay.

Therefore, we see that whenever an organic substance, like wood, coal, straw, manures, or any vegetable matter decomposes, heat is given off. The amount of heat given off is actually the same if the total destruction is rapid as from burning by fire or slow as from microbial decomposition. The heat effect in decomposition is ordinarily not noticed because the heat produced is usually conducted away too fast to be observed.

Everybody knows that a soil rich in organic matter is likely to be highly productive if that organic matter is rotting fast. If it is rotting fast it is releasing available nitrogen and phos-

Reprinted by permission from Better Crops with Plant Food, Jan., 1947, Washington, D. C.

phorus and other nutrients for plant roots to use. But if organic matter is to decompose rapidly, the air (oxygen) supply must be abundant. In other words, if the organic matter is to "burn" fast, the drafts and all check dampers, as in the stove, must be wide open—the soil must be porous and warm.

The comparison of decomposition of organic matter to a burning fire goes even further. If the fire in the stove is suddenly smothered, the burning of the carbonaceous wood or coal would not be able to convert the carbon to carbon dioxide, as in a well-aired fire. Some of the gasses produced would be the poisonous carbon monoxide. Likewise, in a soil well supplied with organic matter (fuel for micro-organisms) if the air supply is poor because of poor tilth, a wrong kind of decomposition (burning) takes place. Certain bacteria called anaerobes will rob oxygen from oxides in the soil, as from iron oxides or oxides of sulfur (sulfates), and convert these to poisons, as hydrogen sulfide (the smell of rotten eggs or a frozen cabbage field thawing), or to ferrous iron—the bluish color of poorly drained subsoils. Besides producing these poisonous products the carbon dioxide produced by this smothered rotting or slow burning fills the air spaces and further crowds out the oxygen.

This comparison illustrates how important it is that organic matter must be in an active process of decaying with lost of air entering the soil to feed these slow fires and to ventilate out the bad air. The ideal condition is like that which Nature builds in unpastured woodland soils. Here the porosity is at a maximum and new fuel, fresh organic matter, is decomposing every warm day when the soil is moist.

We have been thinking of organic matter as beneficial primarily for improving the soil tilth, supplying available nitrogen, and adding to the moisture-holding capacity of the soil; but the heat effect of decomposing organic matter has usually gone unnoticed. From the foregoing we know that when decomposing organic matter, such as cornstalks, is plowed under it is safe to estimate that another ton of roots is involved. Three tons of tops and roots per acre would give off as much heat in total decomposition as the burning of about 1.5 tons of hard coal. This amount of heat is not to be ignored—it has real value to the farmer. But in order for it to be of value, the organic matter must be decomposing actively—the slow fires of the soil must actually burn and more fuel must be added from time to time as with legumes or manures plowed under.

Australian Subterranean Clover

Condensed from Guernsey Breeders' Journal

Howard Snyder

One of the very newest grazing legumes for the United States is Australian Subterranean clover, which has so recently become an outstanding success on the Pacific Coast and is being grown all the way from Texas to the Atlantic Coast.

For centuries this clover has grown as a roadside weed in Europe and North Africa. It was taken to Australia by accident and it was by accident that its feeding values were learned after it grew voluntarily. Now there are many varieties grown in Australia and it is one of their greatest legumes.

When the State Experimental Station at Corvallis began a world-wide search for some legume that would re-clothe denuded and rawboned old hillsides, Australian subterranean clover was one of the importations that was tried and that proved a great success. The dairymen are moving back into the red hill region of Oregon. They are moving back because those nude hills are green with subterranean clover. I know one dairyman who pastured his cows on a seven-acre pasture during the winter and thereby saved 14 tons of hay. And I know a farmer who fattened his February lambs on this clover and no grain and those lambs weighed 100 pounds at six months and topped the market for the day in Portland, Ore.

Subterranean clover is a winter annual that buries part of its seed each year from one-half to one inch deep, thus making reseeding almost certain. Like white clover, it has prostrate creeping stems, and the three leaflets forming each leaf are carried on upright stalks. Seed are borne on short stalks which turn downward and push into the soil.

It is a creeping annual that forms an extremely heavy mass of vegetation which is hard to mow for hay, but which makes wonderful grazing and is a wonderful weed choker and a real soil saver. Erosion is almost an impossibility when soil is covered with a mass of subterranean clover.

Being a winter annual is should be seeded with the coming of the fall rains in order that it may

Reprinted by permission from the Guernsey Breeders' Journal, Peterborough, N. H., February 1, 1947

make as much growth as possible before growth is slowed down by cold weather. In the South it makes some growth in mid-winter, but how much depends on how mild the winter is and how much sunshine there is, as well as how fertile the land is on which it grows. In Mississippi, it is the earliest thing we have in the spring. It is green all winter but cold may slow down its mid-winter growth.

The fact that subterranean clover thrives on acid soils is one of its greatest virtues. Our bleached-out hillsides are the right locations for this clover. It must have well-drained soil. It is not tolerant of poorly drained soil. It will grow on soil too poor for white clover to make a stand on. It does not require so much fertility as Ladino, the giant white clover from Italy. On extra poor soil it makes but slight growth and never sufficient growth for hay. Soil that is extremely poor should be built up with Austrian peas and vetch before seeding to subterranean clover, or it may be fertilized with lime and slag and such other chemical fertilizers as will be determined by your local agronomist and county agent.

The seedbed should be firm. A loose seedbed is always a cause of a poor stand in any clover. A good, firm seedbed, well-fallowed, so that weeds and grasses may be killed out, should be sown with seed only after that seedbed holds a sufficiency of moisture to insure germination of the seed.

This clover does well with the right companion grasses. Where lespedeza thrives, it is well to seed it with lespedeza, carpet grass and dallas grass. Subterranean will reach maturity, reseed itself, and die just about the time lespedeza gets to doing its best growing. There are many mixtures of grasses to grow with it. In the West it is grown with much success with Alta fescue. Some good mixtures are: Subterranean, three pounds; Alta fescue, eight pounds; Perennial ryegrass, six pounds, and orchard grass, four pounds per acre. It is not well to seed bluegrass or Bermuda with it for these grasses choke it out.

Seed should always be inoculated with commercial cultures suitable for crimson, red clover, white clover, and alsike clover, or by scattering from 100 to 300 pounds or soil from well-inoculated fields on the new field.

In dry years, when the ground is hard and stalks cannot push their seed heads down under the ground, the stand may be lost by pasturing too closely, for all live stock greatly relish the seed and most of the seed in dry years matures above the ground. Hogs, turkeys, geese, and especially

sheep, will clean up the seed and ruin the stand for the following year if clover is pastured too closely.

Seed may be obtained by threshing the hay, by a pan attached to mower bar, and by a vacuum suction apparatus that is used after the hay has been removed from the ground. This apparatus sucks up seed that have shattered off in making the hay. Details on this piece of machinery may be had from the Experiment Station at Corvallis, Ore. The seed sells anywhere from $1.50 to $2.00 a pound. Ten pounds per acre give the best results.

If seeded on an already existing sod, you may not see much subterranean clover the first season, as some of the seed are hard and will not germinate until the second season. But once established subterranean clover will have a great benefit on companion grasses because of its great ability to gather and store nitrogen in the soil.

Subterranean hay is excellent, but is not easy to mow or to cure. In Oregon a device has been put on the mowing machines, a set of fingers, we might call them, that lift up the prostrate vines, thus enabling the cutting blade to get under the dense mass of vegetation.

The greatest value of this new clover is not as a hay crop, however, but for winter grazing, and for this it is decidedly worth while and as such a great saver of hay and concentrated feeds.

There is the same number of hours in the day for every farmer, but there is a wide variation in what is produced with that time on different farms.

American Poultry Journal

Those Three Mineral Musketeers

Condensed from New Jersey Farm and Garden

Dr. E. R. Purvis

New Jersey Agricultural Experiment Station

ONLY three of the so-called "minor elements" have been found to be of sufficient economic importance in the mineral soils of New Jersey to warrant consideration by the practical farmer. These are boron, manganese, and magnesium.

BORON

Boron is required by all plants in varying amounts but the quantity necessary for normal growth is always very small. The Soils Department of the N. J. Experiment Station has found that a deficiency of this nutrient seldom occurs on a soil having 0.7 of a pound of available boron per acre. This is the amount of boron supplied by slightly more than six pounds of commercial borax.

Alfalfa is the crop most seriously affected by boron deficiency in New Jersey. The symptoms are a yellowing of the newer leaves accompanied by a rosetting (production of a bunchy growth having short internodes) of the terminal buds. Some of the yellow leaves may assume a reddish cast.

Leaf hopper injury will often produce very similar color symptoms but usually the discoloration from insect injury is more streaked than the typical uniform yellowing produced by boron deficiency. The rosetting of the terminal buds is not affected by insect injury. Suspected boron deficiency can be confirmed by taking a few affected plants to your county agent.

Having established that a crop of alfalfa is suffering from boron deficiency, the remedy is relatively simple and inexpensive. Practically all fertilizer companies operating in New Jersey can furnish a fertilizer for alfalfa containing sufficient borax to supply from 20 to 30 pounds of borax per acre. No extra precautions are necessary in applying such a fertilizer, but the borax must be applied annually to deficient soils.

Other New Jersey crops affected by boron deficiency are in order of their relative importance: tomatoes, broccoli, cauliflower, beets, turnips, and radishes. For these crops, 10 pounds of borax per acre are usually sufficient. Consult your county

Reprinted by permission from N. J. Farm and Garden, Feb., 1947, Sea Isle City, N. J.

agent before applying borax to your soil for, of all the nutrients, boron is the only one which will produce severe toxicity when used in slight excess and crops vary considerably in their requirements and tolerance for this nutrient. Five pounds per acre can severely injure a crop of snap beans.

Manganese

Leafy crops are more subject to manganese deficiency than are others. Spinach is the notable example. Unlike boron, most New Jersey soils contain sufficient manganese for normal plant growth. It is therefore a question of availability and not one of an actual soil deficiency. Along with iron and zinc, manganese is removed from the soil solution progressively as the soil reaction, or pH, exceeds pH 6.5.

No instance of manganese deficiency has been recorded in New Jersey soils below that reaction, so the best remedy for this deficiency is the judicious use of lime to maintain the soil reaction within the range of pH 6.0 to 6.5 for most crops.

With potatoes, and other crops, which must grow on more acid soils, manganese is never a problem.

The thorough mixing of the lime with the soil is as important as the amount applied, for a relatively light application of lime may produce a reaction in excess of pH 6.5 in the surface inch or so of soil, if not properly worked in. Seedlings germinating in this area will suffer from manganese deficiency from the start and normal growth will be obtained only when the roots have penetrated to the more acid soil beneath.

Manganese deficiency produces a mottled yellow discoloration of the leaf area between the veins in spinach and other broad-leafed crops. The leaf veins themselves remain green, even when the rest of the leaf becomes entirely yellow. Small areas within the yellowed area may dry up and become transparent. When recovery occurs, the dead tissue in these transparent areas will drop out and leave clean-cut holes in the now green leaf.

As previously mentioned, the best remedy for manganese deficiency lies in its prevention by not liming the soil above pH 6.5 and by thoroughly working the lime into the soil.

If through oversight, you have limed your soil above pH 6.5, it will be well to include manganese sulfate in your fertilizer at the rate of 50 to 100 pounds per acre for all crops with the exception of alfalfa and clover. If not aware of the deficiency until the crop begins to suffer, as is usually the case, the application of a mixture of 50 to 100 pounds of manganese sulfate with 200 pounds of sulfate of ammonia to each

acre will bring about rapid recovery.

Where spraying equipment is available, more rapid response can be obtained by spraying a weak manganese sulfate solution directly on the plants. This solution should not exceed three pounds of manganese sulfate in 100 gallons of water. From 150 to 200 gallons should be applied to each acre.

Magnesium

Since magnesium is an essential constituent of chlorophyll its inclusion as a minor element is due entirely to the fact that it is not normally considered in commercial fertilizer. Most liming materials contain some magnesium, running from a bare trace in oyster shell limes to 30 per cent of magnesium oxide in the dolomitic limes.

Although possible, where oyster shell or other low magnesium limes have been used over a period of years, magnesium deficiency is unlikely to occur on well limed soils. In any liming program it is well to use dolomitic lime every second or third time.

Thus it is evident that magnesium deficiency will be more prevalent with those crops which are grown on acid soils (pH 4.8 to 5.5) for reasons of disease control as is the case with potatoes, sweet potatoes, and blueberries.

Magnesium deficiency looks very much like that described for manganese. However, the yellow discoloration is more of a solid pattern without the tendency towards mottling which is evident with manganese deficiency. In both cases the veins of the leaves remain green until the final stages are reached. Sweet potatoes is the crop most seriously affected by magnesium deficiency in New Jersey.

Best Remedy

Indications are that plants respond slowly to applied magnesium salts once the deficiency manifests itself. The best remedy lies in supplying the necessary magnesium in the fertilizer to those soils testing low in magnesium, before, or when the crop is planted.

If you are growing any of the above crops on acid soils, have your soil tested for available magnesium. If the test is "low," have a soluble magnesium salt mixed with your fertilizer to furnish from 30 to 40 pounds of magnesium oxide per acre.

Some soils planted to the above crops are sufficiently acid to receive 200 to 300 pounds of hydrated dolomitic lime per acre without raising the pH sufficiently high to encourage organisms. Where such is the case, liming is the cheapest way of disposing of magnesium deficiency.

Some fertilizer companies are

adding five pounds of borax per ton to all of their brands, and most companies make special mixtures with larger amounts of borax. Where borax is added, the fact is always stated on the tag. Many fertilizers contain appreciable amounts of magnesium and some companies are rightfully claiming credit for this essential nutrient in their mixture. There appears to be no valid reason, however, why manganese should be included in the general run of fertilizers at the present time.

Are Hybrid Hogs Coming?

Condensed from The Dakota Farmer

Leslie E. Johnson
South Dakota State College

Can swine breeders follow the same breeding procedure that corn breeders have done and produce a hog that is as far superior to our present hogs as hybrid corn is to open-pollinated corn?

The genreal breeding procedure followed in the production of hybrid corn is to produce inbred lines through selfing, test the yielding power of the inbred lines in various crosses, and then cross selected inbred lines to produce the hybrid seed for the commercial corn grower.

In 1937 the Federal Government established the Regional Swine Breeding Laboratory to study breeding problems and determine specifically if the principle used in hybrid corn production could be used in swine production. The laboratory has headquarters at Ames, Iowa; and furnishes financial aid and coordination to cooperating state agricultural experiment stations. States now receiving such aid are Iowa, Minnesota, Nebraska, Missouri, Illinois, Indiana, Oklahoma and Wisconsin. South Dakota, North Dakota, Kansas, Michigan and Ohio are cooperating in the work, but without special financial aid.

The work has progressed sufficiently to give some definite indications of future possibilities. In the first place, it has definitely shown that inbred lines of hogs can be developed and maintained.

Reprinted by permission from the Dakota Farmer, Feb. 1, 1947, Aberdeen, S. D.

At several of the stations, lines of hogs have been inbred 10 or more years without the introduction of new blood. In some of these lines, half brother-sister matings have been made regularly and in a few lines full brother-sister matings have been made for several generations. In general, these inbred lines have lost some in fertility, growth rate, and efficiency of gain, in spite of selection for these characteristics, but they produce well enough to furnish breeding stock. A few inbred lines even produce as well or better than some regular breeding stock.

The South Dakota Agricultural Experiment Station has one inbred line of Hampshire swine that was started in 1942. The gilts in this line, that farrowed in 1946, produced an average of 10.5 pigs each. These pigs averaged 31.6 pounds at 56 days and 198.2 at 180 days, but the line, like other inbred lines, is not without some faults. Last year there were several pigs in the herd with crooked front legs. This defect varied from a slight curvature to severe crookedness. It is hoped the selection now practiced will remedy this fault. The value of this line is not known but, in the few crosses made, it shows promise.

In speaking of inbred lines, it must be remembered that they are purebred or registered, as are regular pure-breds. The only difference is that you mate closely related animals together. Inbreeding tends to purify the heredity material and to fix certain characteristics which may give high production when later crossed with other inbred lines. Real proof that inbred lines can be established is shown in the fact that there are something over 40 inbred lines now at the State Agricultural Experiment Stations cooperating in the Regional Swine Breeding Laboratory.

A second fact established in this new swine-breeding work is that crossing of the inbred lines of swine improves the pigs in productive characteristics in much the same way as crossing inbred lines of corn improves their producing ability. The cross-line pigs show greater vitality, fertility, growth rate, etc. Not enough crosses have been made with any lines to establish their true value in pork production but again, the results are encouraging.

During the last three years the South Dakota State Agricultural Experiment Station has been purchasing inbred breeding stock from Iowa and Minnesota and crossing them to determine the usefulness of inbred lines in hybrid pork production. In 1945, two inbred-line crosses were compared with a group of regular pure-bred pigs. One of the crosses

did not "nick" and was a decided failure. The other cross of the two inbred lines produced well, farrowing one pig more per litter than our present pure-bred.

These hybrid line-cross pigs weighed slightly less at weaning time, but 23.3 pounds more at 180 days of age. The inbred mothers used in this two-line cross did not appear to mother and nurse the hybrid pigs as well as regular pure-bred sows. After the pigs were weaned, however, and were completely dependent upon their own ability, their inherited capacity to grow was exhibited and they easily outgained all other pigs in the experiment.

In 1946, two-line and three-line hybrid pigs were compared with regular pure-bred pigs. The three-line pigs were the result of taking the gilts from the two-line cross of 1945 and mating them to a boar of a third inbred line. The two-line cross averaged .3 less pigs per litter than the regular pure-breds but the three-line cross averaged 2.3 more pigs per gilt. The two-line cross produced 1.2 less pigs per litter at weaning than the pure-bred check lot, again indicating that inbred sows make poorer mothers. The three-line cross weaned 2.8 pigs more per gilt than the pure-bred check sows.

Thus, it took 35 per cent fewer hybrid sows to raise the same number of pigs the regular pure-breds raised. A sow consumes from 1,600-1,800 pounds of grain and protein concentrate from the time she reaches market weight until she weans her litter and regains enough weight to have the same market value she had in the fall. South Dakota swine producers farrow between 350,000 and 550,000 sows each year. A saving of 1,600 pounds of feed on 35 per cent of 400,000 sows would save 112,000 tons of feed annually. With feed selling at $45.00 per ton, this would amount to a $5,040,000.00 saving for swine producers. Thus, if hybrid sows could be continually produced that would mean 2.8 pigs more per litter than our present sows.

In the 1946 tests, the pure-breds weighed 205 pounds at 180 days of age, the two-line cross pigs weighed 210 pounds and the three-line pigs weighed 201 pounds at the same age. These latter pigs, however, made 100 pounds gain for each 362 pounds of grain and protein consumed while pure-bred pigs required 378 pounds.

These results look very promising, although there are only a few hundred pigs involved in the tests. Further testing must be done and more inbred lines established before the true value of hybrid hogs can be stated.

Cultivating With Oil

Condensed from Farm Journal

EVER see a farm without a cultivator?

No, but such a sight may be getting closer. In southern California, there are 20,000 or more acres of orange, lemon, and grapefruit orchards that are never touched by a cultivator, nor do they have a cover crop. Yet there's not a weed in them!

How do these fruit-growers keep the weeds down? The answer is Diesel or orchard heater oil.

The oil is sprayed on at 75 to 200 pounds pressure when weeds are small, not more than 4 inches high.

Broad-leafed weeds die immediately, but some of the grasses—Johnson and Bermuda—and morning glories, need repeated treatments, perhaps for as long as two years.

Some orchard owners who have used oil for ten years report no damage to the soil or trees from oil. Whether longer use of oil will eventually be injurious remains to be seen, but so far not a single orchardist has reported any trouble. A light application is put on—just enough to wet the weeds—and the spray mist leaves only a slight film of oil on the ground.

Then, too, after the first two years of using oil, little more than spot spraying is needed. The weeds are really down and out.

In general, the orchard soils are improved by non-cultivation weed killing, so the citrus growers report.

There is less erosion because the water soaks into the soil more quickly, and plow soles disappear within a few years.

Most of the growers report bigger yields and high-quality fruit since casting off their cultivators. There are no weeds to compete with the trees for moisture. Less irrigation water is needed.

Now, how about the cost? University of California Extension Service records from orchards using oil show that it costs about $21 per acre the first year.

In the second year the cost drops to $19 and to $13 in the third. Thereafter, it runs about $10 per acre. Regular cultivation in these orchards runs as high as $30 per acre.

These growers never let a weed go to seed. After the main sprayer rig has passed through an orchard men with small hand sprayers follow up at intervals to kill any weeds missed in the main operation.

Weed spray rigs usually have

Reprinted by permission from the Farm Journal and Farmer's Wife, Feb., 1947, Philadelphia, Penna.

boom attachments with wide-angle nozzles, spaced to cover a broad sweep through the orchard. They usually cover two to three acres per hour.

Guards and shields are adjusted on the booms and around the nozzles to protect tree trunks and foliage from oil damage.

Geese on the March

Condensed from The Rural New Yorker

Willett Randall

ALTHOUGH geese are the oldest domesticated fowl, they have never reached the production level of our other breeds of poultry. Meanwhile turkeys and chickens have gone beyond the billion dollar mark, with mass production often being used, even on small plots of ground where all the feed must be purchased. A few years ago this would have been considered impossible. Turkeys were thought of only at the holiday season, and chicken, even for the farm family dinner, was often considered a luxury. Today as we drive across the country, the giant flocks of turkeys we see almost stagger the imagination, while chickens, too, by thousands feed contentedly everywhere.

Yet geese, hardiest of all the feathered race and the cheapest to produce, have until recently been overlooked, at least so far as large scale production is concerned. Now, however, geese are on the march. New breeders are springing up, making the demand for breeding stock better than it has ever been before. There is an excellent market for geese to supply the holiday trade in competition with the turkey which has always held first place in our American homes.

The first consideration is a suitable location. Preferably there should be running water, though this is not strictly necessary. It is important because it saves labor, keeps the birds clean, and is a factor in producing more fertile eggs, because they mate better in running water. While geese may be raised in quite small enclosures, they do best if there is sufficient room so that yards may be alternated and green grass kept growing during the summer season. Three or four acres will raise a lot of geese and the same grounds can be used year after year because geese are not subject to the many diseases of other feathered farmyard inhabitants.

Reprinted by permission from The Rural New Yorker, Feb. 1, 1947, 333 W. 30th Street, New York City

Once we have the proper location, the goosehouse comes next. This may be an open shed made of any cheap material; part of an unused stable will answer for a small flock. Geese stand the cold well and prefer open quarters to closed ones except in the early spring when the eggs are coming. At that time they should be closed in at night so the eggs will not chill before being picked up in the morning. Geese usually lay at night, but may also do so at any time during the day.

Bring your breeding geese to a new home early in the fall; this is all important. They must have time to settle down, choose their mates and feel at home. If you get them late in the spring, they may not lay at all the first season. Start the breeding flock with grown birds in preference to goslings in the spring, because goslings are hard to find and you will waste a season raising them to maturity. Few breeders sell day old goslings, and still fewer offer eggs for hatching. It does not pay breeders of good purebred geese to offer either goslings or eggs since, unlike chickens, fewer young are produced per bird and the breeder gets more return when he grows them out.

Handling Breeders

Keep any good laying mash before them at all times, (such as is commonly used for laying hens); in addition feed at night what scratch grain they will clean up within ten minutes; keep oyster shells ever present and water always, unless they have access to a pond or stream. Nests may be made of any material handy, preferably barrels laid on the side and filled with hay or straw.

You may start your geese laying about three weeks after the egg mash is put in the hoppers. Normally geese start about the first of March, but you can get eggs in January if wanted, although the early eggs chill quickly unless picked up often and fertility is usually lower in the early winter months.

For the beginner, or even for the small flock owner, pair matings give best results. You will get more goslings from a well-mated pair than you will with three or four females mated to the same male. While ganders are usually polygamous, you will notice they are happily married to only one goose, and stick close to her nest. If, however, extra females are in the pen, the gander will mate with them while the eggs are coming, but then forget all about them when the laying season is past.

Several pairs in the same enclosure do well, but sometimes there will be fights among them, although usually the worst to happen is the loss of a few feathers. The commercial breeder who wants to raise geese in large

numbers will, of course, use a different mating plan, which may be two females to each gander, and he will run them in flocks of 20 females and 10 males. Such matings give good results and that number makes a good beginning for a commercial flock, but you must expect more infertile eggs from such matings than you will where pairs only are kept. Once the gander has made his choice among the females, there is little shifting of mates in after years, unless something happens to his favorite, in which case he promptly takes another wife at the advent of the next laying season.

While old, fully mature female geese are by far the best as breeders, for the most part you should choose young fully grown stock, around six months of age, to start with. You won't find old geese for sale as a rule, unless for some special reason. Those who have them know their value and keep them. Some times geese are discarded because they are inferior layers, and if you have only a small number of breeding females, you will soon know which are the heavy producers. Young females in their first laying season are good and will start you off well, but they lay fewer and somewhat smaller eggs.

Geese live to a great age and breed better each successive season. They mature at about three years. Once you have a well-mated pair that breed well together, do not separate them, for they will last as long as you will want to raise geese. Occasionally an old gander at 10 or 12 years may get cross or too heavy to be of value, in which case he should be discarded for a younger male. Here at Ark Farm we have two 18-year-old females that gave as good an account of themselves as the young females this past season, and a gander 21 years old gave us more goslings than any other single gander on the place. We also have a white Chinese gander, now 14, that gave us more than 50 goslings when mated with a flock of six females. Although three wives is the maximum number that should be used, we were forced to double his mating this year because one of our ganders of this breed was killed at the start of the laying season. There are more than a dozen breeds of geese, both wild and tame. However, the standard four are: Toulouse, Embden, African and White Chinese. The first two are the largest, the Africans come next and White Chinese the last. Up until recent years the Toulouse were most numerous, but now the Embdens equal them in numbers and are preferred by some because they are pure white while the Toulouse are gray and white. In the early days of the Embdens they

were not high in egg production, but the best strains now rank close to the other large breeds, having been increased by selection and trapnested by several farsighted breeders.

There is not much difference in the price of goose feathers if well cured, but the all white seem to hold a slight edge. Feathers are in demand and, like wool from the sheep, give us a double revenue. Plucking live geese is a relic of barbarism and is not practiced today among the best breeders. Some argue that it is better to save the feathers than to let them fall naturally and waste, but the trouble is that if plucked at all, this must be done soon after the breeding season is over. At that time most of your old females, having brought off a brood, are thin in flesh and in no condition to be plucked. Late July is the usual time for shedding. Toulouse and Embden produce the most feathers because they are larger and their feathers are also longer. Africans are shorter feathered than any of the others and pluck the hardest.

The market value of all four breeds is good. Which you select depends upon your market and upon which breed you like best. The size is often important. The holiday trade asks for large, well fattened young geese. The Hebrew holiday demand is for all weights from light to heavy. Young roasting geese in midsummer appear to have an increasing demand, and while this branch is apparently new, it should expand. While the large breeds have in former years held first place, the demand in some markets is swinging to the crosses and smaller types. Here at Ark Farm we specialize in the production of geese for breeding purposes only, but there are always some birds that are culls or which do not measure up; those birds must go to the butcher. For the past three or four years, these market birds on the block have brought as much, or nearly as much as breeders. We therefore have followed the lead of other producers and culled them very closely. If we were breeding exclusively market stock, we would select the best of the pure White Chinese and use the ganders for crossing on the Toulouse and Embden. This cross follows the same line of breeding among geese as that of the Red-Rock chicken cross, with which most of you are familiar.

The Chinese, while the smallest of all the four breeds used, are at the top when it comes to egg production. We personally like them best and raise more of them than all the others combined, because they lay double the number of eggs that other breeds do. Smaller in size, they set best be-

cause they break fewer eggs. The best pure strains of white Chinese weigh close to 10 pounds dressed, which is what the average family now wants. The ganders are more polygamous and will handle more females with a higher percentage of fertility. If early eggs are desired, you can start them almost any month in the year. We have not been able to do this with the larger breeds. And when it comes to crosses, White Chinese ganders will mate readily with all other breeds, and the offspring grow rapidly, maturing more quickly than any of the breeds in their purity.

New Fescue Crop

From Kentucky to Florida come enthusiastic reports from farmers growing Kentucky 31 fescue.

This perennial bunch grass, a strain of Alta fescue, was first discovered growing in the rugged mountains of eastern Tennessee. A few years ago the Kentucky Experiment Station got some of the seed and began growing the grass.

It passed the tests, and is now winning new farmer friends each year. All classes of livestock like its rank-growing foliage. Farmers like its ability to stand drought, wet ground, intense heat, and cold weather. Although it naturally does better on good soil, it makes a good showing on poorer land.

Kentucky 31 fescue quickly forms a firm sod, and appears to be an answer to the southern stockman's need for a winter grazing crop. Last fall, C. Kirkpatrick, Jr., of Christian County, Ky., had 75 head of sheep on a 35-acre field of the fescue he had planted six weeks before. One of his neighbors, Henry V. Thomas, has found that this non-legume crop is a good partner of ladino clover. Although the grass grows fast, Thomas says that the ladino clover holds its own.

Kentucky is still the leading state in growing the fescue, and any requests for seed or further information can be sent to Wm. C. Johnstone, Kentucky Extension Service, Lexington 29, Ky. Seed production is gaining and Johnstone estimates more than a half million pounds (seeding rate 10 to 15 pounds an acre) will be harvested in 1947.

Farm Journal

Large Laying Pens Save Labor

Condensed from Everybody's Poultry Magazine

Louis M. Hurd

"It takes no more time to attend to one of our 1800-bird pens than it does some of our 600-bird pens," said an eastern New York poultryman last fall. Converting from pens of about 250 birds to 1800 birds on this farm cut the number of them required to do the chores from four to two. It stands to reason that more time is required to enter two pens, gather eggs from two sets of nests, measure and supply feeds to two places, and do the other jobs than it does to do the same chores in one large pen with the same number of hens. Labor shortages during the war stepped up the trend towards large flocks and today flocks of 500 to 1000 hens in one pen are not uncommon on successful poultry farms in the Northeast.

Recently, in taking a time and distance record on a poultry farm near Rochester, N. Y., we found that it took 8½ minutes to feed grain and gather the eggs for 800 birds in one house, and 16 minutes to do the same job for 625 birds in another house. The first house had four pens 24 by 25 feet, while the second house had seven smaller pens of various sizes.

Two years ago, when we took the time and distance records on eight farms in central New York, we found that where the birds are kept in large flocks the work was done in less time and with less travel. This was true on the farm where the chores were done in the shortest time, with the least amount of travel. All the birds on this farm were kept in one building. Each floor of the building had a feed room in the center and space for an elevator. There were 480 Leghorn hens in a 20 by 60-foot pen on each side of the feed room. The feed was brought up to the feed rooms on the upper floors by a homemade electric hoist, while the trough feeders with dry mash were placed end to end in each pen with the end of the line toward the door where the operator entered. This arrangement saved time and travel in filling the feeders. Water was piped to the various fountains in the pens but was not automatically operated.

The nest sections were in the center of the pen, near the door where the operator entered. Two trips were made to the pens durthe day to care for the flock. The poultryman had his work

Reprinted by permission from Everybody's Poultry Magazine, Feb., 1947, Hanover, Pa.

so well organized that he was able to do all the chores for the day for 2500 hens in just 52 minutes, and traveled only 1613 feet in doing this work.

When most people hear about this record they say it is impossible to do the work for as many hens in such a short period of time. Nevertheless, on the day that we visited this man a careful record was kept of the time and travel of every operation in performing the chores. Experience on this and other farms has shown that a considerable amount of work can be done in a short period if the work is well organized. This is particularly true if the birds are kept in large units.

One Man Tends 6,800 Hens

I recently visited the farm of Mr. Andrew E. Danish, near Troy, New York. Mr. Danish keeps 6800 birds on his farm. With the exception of the special breeding house, where 1000 birds are kept in small units, the rest of the birds on this farm are kept in four large flocks in two buildings. The larger house is 30 by 160 feet and three stories high. The top floor is one pen and accommodates 1800 New Hampshires. On the second floor there is a pen of 1600 Leghorns and a feed room. There are 1000 birds in the basement pen. The top floor of the other building has 1400 birds.

Mr. Danish's brother (just back from war service) does all the chores for the 6800 birds during the day. This includes feeding, watering, gathering the eggs, and packing the eggs for shipment. He begins work in the morning at seven-thirty and ends the day about five-thirty in the afternoon. I timed this man when he was filling the dry mash feeders in the pen that had 1800 New Hampshires. It took 200 pounds of feed and four minutes' time to fill the troughs. This included the time to go to the feed room to get the feed. He did this by bringing in a full 100-lb. sack of feed, opening a hole in one end of the sack, placing the sack on his shoulder, and allowing the feed to trickle out of one corner into the dry mash feeders as he walked along.

Mr. Danish has found by experience in filling the feeders by this method that he can save a lot of time and walking by having the feeders end to end.

Not many men would want to carry a 100-pound sack of feed on their shoulder and distribute it through the mash feeders as he does, but in these large pens it would be possible to use a carrier, which would make the hopper-filling much less strenuous. The arrangement of the dry mash feeders in line, so they could be filled conveniently from the carrier, would be important.

Mr. Danish is enthusiastic about large pens as labor savers. He says: "Now that we have them, we wonder why we hadn't thought of the idea before. You can allow less floor space per bird in large pens, as for some time we have allowed less than 3 square feet for the Leghorns, and about 3 square feet for New Hampshires. Another surprising thing is the way the birds spread out over the entire room. I credit it to even distribution of air." He uses the flue system of ventilation.

"We try to keep production above 55 per cent the year-round. Early in the season and at other periods, we reach 75 per cent, and at most times it is above 60 per cent. Our mortality has averaged around 12 per cent, but we cull often to avoid mortality."

Mr. Danish uses a hook to catch some cull birds, but most of the culling is done at night with a flashlight. Testing for pullorum disease is done at the time the pullets are brought in from the range. This saves picking up the birds a second time.

With large pens it is not always possible to have enough pullets mature at the same time to completely fill a pen. Mr. Danish puts the birds in as they reach full development and completes filling the pens with later-developing birds.

Excellent hatching results are obtained in large pens. Mr. Danish allows seven males for each 100 females. "Our New Hampshires seldom hatch under 80 per cent, and do better most of the time," he says. "The 1945 Leghorn hatchability for the season was 76 per cent. The high fertility and hatchability we feel is due to less fighting because the males have more room to roam."

The largest number of birds that I have seen in one flock anywhere was on the farm of Andrew Guzman, in Connecticut. Mr. Guzman keeps 9500 birds on his place. The largest unit being 2400 black crossbred pullets in one pen. This house is about 24 feet wide by 180 feet long. It has 200 nests in a single tier running the length of the building on the back wall. One trough drinker 8 inches wide and 8 feet feet long is the only source of water for this flock. A continuous stream of water runs into one end of this trough by means of a hose. The overflow runs out through a 1½-inch hole at the opposite end. The water in this trough is never more than one inch deep. The rest of the birds on this farm are kept in large flocks, but not quite as large as the one just mentioned.

Two men do most of the work. The mother of the operator helps in gathering eggs and in packing them for market. All houses are equipped with carriers. One trip

is made through the pens daily to feed mash and oats. Incidentally, oats are the only hard grain which this man has fed for six years. Two trips are made through the pens to pick up the eggs. Each time the full baskets are left in the feed room near the door. They are then picked up by truck and delivered to the egg room. This saves a large number of trips back and forth from each house to the egg room. The egg production on this farm, on the hen-house basis, averages about 180 eggs.

From what I have seen during the last six months in visiting farms in New England, on the eastern shore of Maryland, in the Middle West, and in New York State, it would appear that with modern equipment and large pens it is entirely possible for one man to do the chores for 5000 layers and, in some instances, pack the eggs produced for shipment. Of course, when one man takes care of this number of birds, he will probably have to have help in making the annual change in litter and in cleaning out the pits or dropping boards.

Clean Potatoes Promised

An effective control for potato wire-worm has been discovered by Dr. Douglas E. Greenwood, Connecticut Agricultural Experiment Station staff member, it was announced this week. This insect is one of the most bothersome pests in New England.

Field tests the past summer by Dr. Greenwood with Gammexane, a new type of insecticide, indicated that effective wireworm control is practical. Various methods of application were tried in varying amounts. The most satisfactory was a broadcast treatment where diluted Gammexane dusts were applied with a grain drill and disced into a depth of five or six inches. Two pounds of the crude material (applied as 65 pounds of three per cent dust) resulted in excellent control.

Only 3.9 per cent of samples were below U. S. No. 1 grade due to wireworm damage compared with a nearby check which was 53.4 per cent out of grade.

The Gammexane treatment seems to be a cheap, easy effective method of control, the announcement concludes.

N. E. Farm Finance

Before Buying a Farm Check These Points

Condensed from The Agricultural Situation

Harold C. Larsen

Bureau of Agricultural Economics

MANY veterans, young and full of ambition, are planning now to buy farms of their own. For a goodly number, farming will prove a good life work. In the nature of things, however, some will come to grief, and through causes that can be avoided. As shown by their letters to the Department of Agriculture and the Land Grant Colleges, veterans recognize that some of the causes of future trouble can be dealt with in advance. through their own forethought. To this end, they are wanting the best advice possible.

Their own county agent is the best source of such advice, along with the State agricultural colleges. The local county agent has a wealth of knowledge about local situations.

Farming is a complicated business. A farmer must know how to handle the job of crop and livestock production, how to use and repair farm machinery and buildings; and what and when and how much to buy and sell. In short, he must be able to successfully combine all of these skills and many more into a well managed farm.

The farm plant should be large enough to provide a decent living. An efficient farm unit is required to make proper use of modern machines and methods. The soil itself should be reasonably good, and the farm organized and located so that its products can be readily marketed. Electricity is important. Adequate schools and other community service should be convenient.

In buying a farm it is absolutely essential to make sure that the probable future income from the farm warrants the price asked. Prices of many farms are now high. Find out whether the present favorable income of the farm under consideration is likely to continue, or be substantially less. A word of caution—a buyer of a high-priced farm may have to pay for it out of low income in the future.

If a farm is found that meets the necessary requirements, the next step is to arrange for its purchase, and the financing of

Reprinted by permission from The Agricultural Situation, Jan., 1947, Washington, D. C.

the purchase. The following check list includes the major points in buying and financing, but they are by no means complete in detail. It is highly desirable to have the assistance of an informed person who can be relied on to help in closing the deal.

Contract of Sale: After tentatively agreeing with the seller to buy the farm, the first step is to have a written contract of sale setting forth all the terms and conditions of the transaction.

This contract should include a legal description of the land. But the legal description probably will not indicate anything more than the location of the land and the number of acres. One who buys farm land also buys buildings and permanent improvements to the land. Sometimes these items are not always clear, so it is wise to have borderline items specifically set forth in the contract to avoid future misunderstanding.

Additional items in the contract will include agreement on the purchase price, how and when payment is to be made, who is to pay accumulated taxes, insurance, water charges, etc., when the buyer will take possession and who will pay the costs of conveyance.

Probably most important, the contract of sale should stipulate that the buyer will not buy unless the seller proves a clear title.

Deed: A deed is the official written instrument transferring title from seller (vendor or grantor) to buyer (vendee or grantee). There are many types of deed, such as sheriff's deed, quit claim deed, and warranty deed. The warranty deed in giving title to the buyer warrants that the seller will defend title against anyone who may claim interest in the property. Other deeds give the buyer only such "rights and interests" as the seller may have in the property and usually are not as desirable as a warranty deed. A deed is usually drawn up by an attorney at the expense of the seller and should be recorded in the county title records.

Abstract of Title: This is essentially a history of the title, showing former transactions and owners, existence of liens and encumbrances, and any other matters bearing on the title to the property. The chief purpose of an abstract is to furnish an attorney or other trained person the means by which he can examine the title to make sure that it is not "clouded." This should always be done. A farmer would have considerable difficulty getting a loan on his property without clear title, and it is the abstract, not the deed, that furnishes the proof. Some States have "torrens land laws," which

mean the State guarantee is behind a registered title.

An abstract costs money, the amount depending on how complicated previous transactions have been. Some abstracts may cost as much as $100 or even more. The contract of sale should state whether the buyer or seller is to provide the abstract and stand the cost.

Promissory Note: Few buyers, especially veterans, are in a position to pay cash for an adequate size farm. Thus they borrow, which is good business when the expected income from the farm will be sufficient to pay the interest and principal on the loan without jeopardizing the standard of living from the farm. A borrower usually signs a note, an unconditional promise by the borrower to pay a certain amount of the money to the lender at a stated future time. The note states the annual interest rate to be paid and where the money is to be paid. The lender can enforce the terms of the note through the courts whether secured by a mortgage or not.

Mortgage: A mortgage, given as security on a note, means the borrower agrees to transfer the property to the lender if unable to meet the terms of the note. The actual security may be real estate, machinery, crops, livestock or other property. If it is on real estate, it is known as a real estate mortgage, if on machinery, livestock, etc., it is called a chattel mortgage. A variation of these mortgages is the "deed of trust" under which title is vested in a third person who holds the property in trust for the lender.

Sales Contract: This is not to be confused with a "contract for sale" which sets forth the terms of the transaction and binds the parties only for such time as is necessary to make permanent arrangements. A sales contract, on the other hand, gives the buyer possession of the property and states the proportion of purchase price to be paid off before the seller gives a deed. It may be years before the buyer under such a contract will actually own the farm.

Payments: Because income from farming is notably irregular, the mortgage should have a provision allowing the borrower to make large payments when income is high, and smaller payments when income is low. If the borrower is not able to obtain this position, he should himself set up a reserve to meet the payments in years of crop failure or low prices. A growing proportion of real estate mortgages are written so that each regular installment includes a payment on the principal as well as interest. These loans are called amortized loans.

Recording Papers: It is essential that important legal papers be recorded by the county official who keeps public records. This is especially true of the deed, mortgages, and the release of the mortgage which is given by the lender when the loan is paid in full.

The points outlined here are purposely brief, but many are frequently overlooked. No one should attempt to buy a farm solely on the basis of this discussion. It is highly desirable to get in touch with a qualified person or agency for information and help about a particular area or farm. A few are the county agent, State agricultural college, or the United States Department of Agriculture.

Scab-Resistant Spud

A new, Colorado-developed, hybrid potato may be the answer to a lot of disease problems in spuds.

Known so far only as USDA 6317, this potato is definitely scab-resistant. Also, it has not shown a trace of late or early blight, masaic, or leaf roll, ever when grown in fields where these diseases were taking a toll on other potatoes.

With annual losses from scab alone running about 20% in the United States, the new variety looks like a good find.

USDA 6317 is a cross of the Katahdin with a highly scab-resistant seedling. Produced by USDA and Colorado A. & M. crop breeders, it is a mid-season white potato of good cooking quality. It also does well as an early potato.

Last year the new potato held its scab-resistant record when tried in 14 states.

Farm Journal

Feed the Crops for High Yields

Condensed from California Cultivator

R. E. Stephenson

PLANTS that are well fed produce a rich harvest in both the quantity and quality of product. Feeding the plant sounds simple — 11 or 12 elements come from the soil and three come from the air and water. All are equally important in that none can be excluded and obtain a harvest. Then the simple answer might appear to be that plant feeding consists of attention to 11 or 12 soil-derived elements.

All elements are not equally abundant, however, in the soil or in the plant. One element, carbon, which comes from the air as a gas, carbon dioxide, makes up 40 percent or more of the total dry material of plants. The plant takes in this element only in the form of carbon dioxide. The air has its carbon dioxide renewed by the oxidation of organic matter and by the respiration of plants and animals. A soil rich in humus evolves carbon dioxide faster, one of the reasons for better plant growth. Because this gas is heavier than air, it tends to remain near the ground about the foliage, and passes into the plant through leaf pores, which are called stomata. Increasing the supply of carbon dioxide increases the yield of plants. The only practical way to increase the carbon dioxide available to the foliage is to improve the soil with manure, plant residues and fertilizers. The soil then becomes more active biologically and evolves more carbon dioxide.

Growth of the plant involves protein formation. The protoplasm content of every new cell is rich in protein materials. Proteins contain about 16 percent nitrogen. The entire plant may contain as much as 25 percent of protein material. Thus, nitrogen, coming from the soil, though originally from the air, is needed in relatively large amounts because of its essentiality for protein formation.

Proteins contain also some phosphorus and sulphur which, though not present in as large amounts as the nitrogen, are just as essential for growth. The phosphorus tends to concentrate in the seed of the plant and is especially important in those crops raised primarily for their seed. Since sulphur is essential to protein formation, carriers such as gypsum are especially important in growing high-protein crops,

Reprinted by permission from California Cultivator, July 6, 1946, Los Angeles, Calif.

legumes and the cabbage family.

Calcium or lime is an important nutrient element because it serves so many functions related to the welfare to the plant. It is an essential constituent of the cell wall of the plant, without which the cell soon would cease to function in assimilating nutrients for growth. Calcium is an antidote for many plant ills. Toxic, organic-acid waste products in the plant cells are rendered harmless when there is sufficient calcium to combine with them and throw them out of solution. Calcium keeps the soil sweet and provides a healthy environment for root development and functioning. It is relatively abundant in the most productive soils.

Magnesium is a constituent of the chlorophyl or green coloring of the plant. Through the chlorophyl the plant is able to utilize the sunlight as the source of energy for vital processes of metabolism. Though not usually as abundant in the plant, magnesium is just as essential as calcium for growth.

While the specific functions of some elements are not known, and they are present in the plant in relatively small amounts, their essentiality is well established. Only minor amounts, sometimes too small to be easily detected, of boron and zinc may be needed. But the failure of the supply of these minor elements is just as disastrous to the plant as a failure of the supply of nitrogen or any relatively abundant nutrient element.

Some elements, potassium is a good example, do not appear in any seemingly essential combination with the plant tissue. But potassium is abundant in the sap, partly in solution and partly in insoluble forms, and is very important to vital processes. Plants appear to be unable either to manufacture or to translocate essential foods for growth without sufficient potassium. And so this element, while not an integral part of plants cells or organs, must be close by where photosynthetic and all associated processes are occurring.

Some elements, such as silica, may be abundant in the plant and yet have no essential function. It is possible that silica (the element of sand) may be helpful to the functioning of some other essential element, particularly phosphorus. Sodium though not necessary to the plant may help potassium in whatever nutritional processes potassium is involved.

Some non-essential elements may be present in the plant without causing any injury unless they become too abundant. Thus aluminum may be present to some extent in all plants though not needed for their growth. But if too much is absorbed into the plant, perhaps because the soil

is highly acid, it may interfere with the phosphorus nutrition of the plant. Aluminum combines with phosphorus to form an insoluble combination in the cell sap; and if too abundant, may take so much of it out of solution that the plant is starved for phosphorus regardless of the amount of that element in the soil.

Thus the feeding of plants for their best nourishment and big yields may become a rather complicated problem. However, nature, assisted sometimes by the science of men, does remarkable things in growing big crops. An authentic cherry yield of 19 tons an acre, 225 bushels of corn, 120 bushels of wheat, more than 1,000 bushels of potatoes, and comparably high yields of other crops, though relatively rare occurrences, serve as goals at which to shoot.

Soils compete with plants for nutrients that are supplied in the form of fertilizers. If not rightly used, the soil may so completely tie up fertilizers that the crop receives little benefit. Fortunately, much is not known about how to reduce soil fixation to the minimum and to get nutrients to the plant most effectively.

Whether or not all nutrients must be in solution before absorption can occur, there must be an adequate supply of moisture in the soil. Lack of moisture just as definitely limits yields as lack of nutrients. And, though the soil moisture may never be low enough to cause plant wilting, lack of sufficient moisture for the highest metabolism may limit yields. The growth rate has been observed to slow down when only half to two-thirds of the available soil moisture had been used. But excessive moisture is as bad as too little and water-logging the soil in warm weather will reduce yields. If continued long enough, it may kill the crop.

Disregarding the cost in time and effort, the most effective way to supply plant nutrients is to put them into solution and add the solution to irrigation water which wets the soil about the root zone. This water solution might well contain most of the elements essential for plant growth. Not too much of the solution should be added at one time but three or four applications should be made during the growth period of the crop. The crop is then less likely to be retarded in growth because of an insufficiency of any essential element. Fertilizers are sometimes applied in solution through sprinkler systems and occasionally with sprinkler tanks.

Modern methods of fertilizer application in the dry form attempt to place the fertilizer so that it may more readily go into solution and have a high, positional availability to the root

system. The best placement method to use may be dependent upon the soil, weather, crop, and kind and amount of fertilizer used. With a very valuable crop the cost of the fertilizer is of little significance — the results are what count. With a grain crop of low acre value, results are important but the cost of fertilizing relative to returns assumes major importance. If there were always plenty of moisture in the soil, fertilizers could be used more carelessly with good results. A method of application that is suited to the use of 100 pounds of fertilizer an acre would not be suitable for the use of one ton an acre. Using heavy applications of fertilizer carelessly may burn the plants disastrously in hot dry weather.

Nature's processes that affect nutrition will operate most advantageously with a liberal application of fertilizer on the plowsole. One ton of 6-10-4 would be fairly liberal fertilizing. Plowsole placement gets the material down six to eight inches into moist soil and beyond the reach of tillage tools. This is favorable to high availability of the fertilizer after the plants are well started. But the very young plants need a boost also. This can be provided by the use of 100 pounds to 200 pounds in the row. For the best placement, this fertilizer should be a little deeper than the seed and preferably in bands on both sides of the row two or three inches away from the seed.

When the plant is well started, side dressings of soluble fertilizers should be used. Nitrogen fertilizers are especially affective for side dressings; the last of which should be made just as the plant is approaching full growth. Two side dressings may be sufficient for the season.

Only the most valuable crops will justify such liberal fertilization. An ordinary grain crop probably will not justify the expenditure of more than $5 to $6 an acre for fertilizer. A thousand-dollar-an-acre crop, on the other hand, will justify any fertilizer program that is necessary to get results.

The elements most likely to be deficient in the soils of the West are nitrogen, phosphorus, potassium, sulphur, sometimes manganese, copper, zinc and boron. In some cases soil acidity and in other cases alkalinity may present a problem for correction.

Only one who knows what is deficient can correct the condition. Diagnosis, therefore, is of first importance. Deficiencies are indicated by soil tests, by plant symptoms and by field fertilizer trials. New deficiencies unsuspected before may suddenly appear. Therefore, every grower must be constantly on the

alert. The prevalence of low yields is the best evidence of uncorrected deficiencies. The urge for increased production to feed starving people, together with good prices for products, should afford a strong incentive to everyone to give more than the usual attention to the controllable factors of crop production, moisture control by irrigation, fertilizing for good nutrition, and humus renewal to conserve the soil resources for future generations. Application of present knowledge, the best "know how" that science can provide, can reasonably be expected to increase crop yields by 50 percent, and in so doing bring a good measure of both profit and pleasure, a just reward for feeding a crop well.

Britain's Rural Craftsmen

John Snowden

BRITAIN'S country crafts, the rural industries which for centuries fostered and produced some of the finest and most typical of the nation's traditional craftsmanship, are being revived and developed in a vast country-wide campaign.

Fostering this phase of Britain's post-war production is a Government-sponsored craft development and training program which will again stamp the "Made in Britain" hallmark of fine craftsmanship on world markets and meet the needs of an expanding countryside.

Inspiring this rural extension is a surprising post-war population trend: thousands of demobilized and ex-servicemen and women, free at last to choose their own way of life, are migrating from Britain's congested cities to start a new way of living in the countryside for which they fought..

This is no dilettante diversion of a few post-war escapists. It is a vigorous move to blend the tradition of the old country crafts with the rural expansion of a Britain rebuilding from the bitterest war in history.

Set Up By Ministry of Agriculture

Coordinating and directing this new impetus is the Rural Industries Bureau, a State-aided organization set up in 1921 by the Ministry of Agriculture to encourage and develop rural industries in England and Wales.

Instructor craftsmen attached to the bureau are continually

traveling the countryside, advising the installation of new plants, supervising and giving training, and providing an up-to-date advisory service on methods and markets.

Craftsmen of particular significance to agriculture and food production were specially encouraged during the war years. Small country engineering shops, blacksmith's, wheelwrights, cart and trailer builders and rural brick and tile yards are still the main objects of the Bureau's attention.

The village blacksmith is traditionally typical of the British rural craftsman who is finding new importance in agricultural development. The wartime increase of arable farming with its corresponding mechanization speed-up created a demand for the services of the smith in the repair and maintenance of agricultural implements and machinery, which has established his priority in countryside working life.

To the clangor of the hammer on the anvil has been added the hiss of the oxy-acetylene welding torch, for with the aid of the Rural Industries Bureau the blacksmith is undergoing a technical revolution.

This is being carried out by a team of traveling instructors with training vans. Instruction given at smithies and other rural centers now covers arc welding, general smithing, farriery and agricultural engineering, including the repair and maintenance of tractors, tractor ploughs, binders and combine harvesters. More than 1,750 blacksmiths have already received training under this scheme.

An apprenticeship for farriers and blacksmiths has been set up by the National Joint Apprenticeship Council—representing masters, men, the Bureau and the Ministries of Labor and Education. This body controls the local Joint Apprenticeship Committees throughout Britain, which supervises the training of apprentices with approved craftsmen, and ensures their part-time training at technical colleges.

Disabled ex-servicemen are training for a rural craft through a Ministry of Labor course in saddlery, one of several vocational courses arranged for the benefit of men discharged from the Services who wish to change to a rural life. Britain urgently needs 200 saddlers alone, for many of the present saddlers are elderly and the continuance of their craftsmanship by passing on the secrets of their leather skill has been a matter of some urgency.

Although village pottery production suffered a wartime slump, rural brick and tile yards were encouraged to produce drainage tiles for the increased

arable acreage of the food production drive. Advice on special kiln designs, the purchase of improved machinery and the instruction of workers was given as part of the Bureau's service to rural craftsmen.

Many country cart builders and wheel wrights have re-equipped their shops with modern woodworking machinery on the advice of the Bureau's technical experts. Training in welding and smithing has also been given.

There is a great shortage of thatchers throughout Britain, both for straw and Norfolk reed thatching. A countrywide survey is being made by a Thatching Officer, who is reporting area requirements, as a result of which local training schemes may be started.

There is a keen demand for the hurdles made by Britain's underwood workers—country craftsmen who make these products from their coppice wood plantations. Although hurdle making, most prevalent in southern counties, is essential, the slack times are used for making thatching spars, rakes, sheep cribs and crate rods. The cleaving of poles for chestnut pale fencing, and walking stick making, are similar occupations.

Basket weaving, centered mainly in Somerset, is another craft particularly suitable for war-disabled and blind persons, which revived considerably during wartime. Vocational training in basket making is being given by the Ministry of Labor, and the Ministry of Agriculture is advising trainee craftsmen in the cultivation of willow beds, or holts.

Another select craft is that of the hand-loom cottage weavers and spinners of the Hebrides and certain English and Welsh rural areas. Their material commands high prices among exclusive fashion houses and tailoring establishments. For those who elect to follow this particularly individualistic craft, the Bureau is ready to help with expert advice and encouragement.

Rinderpest — The Cattle Plague

Condensed from The Ceylon Daily News

Hector C. Perera, G.V.Sc.

Honorary Secretary, Ceylon Veterinary Association

AFTER an absence of nearly a decade the cattle plague, commonly known as rinderpest, has once again made its unfortunate appearance in India. Many will remember the great havoc it played during its prevalence in the past. It ruined many a dairyman and caused bullock transport to come almost to a standstill. "Its ravages upon cattle in the dry zone not so very long ago constituted perhaps the darkest chapter in our livestock history. Then village and wilderness alike periodically took the appearance of an excavated burial-ground."

A disease of ancient lineage known to mankind from very early times, rinderpest has existed practically from China to Peru. It is believed that the original home of the disease was the Steppes of Central Asia. Mention is made of rinderpest in Chinese and Russian Literature and in old Ayurvedic books. According to veterinary history the disease was known to the Egyptians, Greeks and Romans. It is said that in Germany alone 30 million head of cattle died of the disease in one century.

Cause

Though vast sums of money have been spent and are still being spent on research work in connection with rinderpest the actual causative organism of the disease has not yet been discovered. Nor have we very effective methods of treatment—excepting biologicals for prophylactic treatment. Even the famous Prof. Robert Koch intrested himself in the disease and worked on it when he came to India. One thing however is known, that is, that rindepest is caused by a virus—a germ so small that it can pass through the finest porcelain filters. Men, horses, dogs, cats and birds are immune from the diseases but sheep and goats are susceptible to it. The incubation period of the disease is from 3 to 9 days.

Nature and Symptoms

An acute rapidly spreading disease of cattle, the first noticeable symptom of rinderpest in a herd is that a number of animals are affected. The sick animals show a temperature which may vary from 103°-170° F. The animals cease ruminating and show marked depression and dullness. They

Reprinted by permission from The Ceylon Daily News, Ceylon, India

stand apart from the healthy ones with their head and ears drooped and their backs arched. To the touch the temperature is unequally distributed throughout the body of an affected animal, the horn, ear-base and the root of the tail being hot. Later, as the disease progresses, the eyelids become swollen and there is a profuse flow of discharge from the eyes. Due to the severe irritation of the nasal passages the animal is seen frequently blowing at the nose. An examination of the mouth reveals small eruptions like bran sprinkled on the membranes of the mouth. If these bran-like eruptions are rubbed together with the fingers the flimsy covering over them peals off and an angry looking raw surface appears. In certain animals warty eruptions sprout on the skin. Pregnant animals abort at the height of the fever. Due to the intestinal tract being affected the animal suffers from constipation at first, but later on sets the "rice water" diarrhoea so characteristic of the disease.

Last Stages of the Disease

The following accounts gives a vivid description of the disease in its last stages. "Purging now sets in, the faeces at first being watery and mixed with small hard pellets covered with blood and mucus but afterwards consisting of a fluid matter only with flakes of mucus, blood and aphtha, yellowish brown in colour and most offensive in odour; the abdomen becomes tender. There is great prostration, difficulty in swallowing; the animal is down and has no power to rise; there is a characteristic holding of the breath during expiration, which after a perceptible interval is resumed with a moan."

"Towards the termination of the disease the staring look of the sunken eyes, dirty nasal discharges, foamy saliva in the corners of the mouth, difficult and groaning respirations, frequent thin fluid faecal discharges and the repulsive odour emanating from the body furnish a characteristic picture of the disease. The completely devitalised and exhausted animal usually dies after a long death agony."

It should however be remembered that all animals do not live sufficiently long or go through the whole train of symptoms. Some die after the appearance of the high fever, that is, about the third day.

Mortality

The mortality rate is high in rinderpest. Among European breeds of cattle the disease is almost 100 per cent fatal. Among Indian cattle the Sindhi breed is very susceptible to the disease and the death rate among those affected is very high. Animals that recover from rinderpest are

immune for life, so are the calves born from immune mothers.

How It Is Spread

How is the disesae spread? As was mentioned earlier in this article, the disease is caused by a virus which is present in all the secretions and excretions of the affected animal. The blood, the urine, the eye and nasal discharges and the foecal material are very infective. It is conveyed from animal to animal by direct contact or through the agency of food, litter or water polluted by infected material, by footwear, clothes and hands of persons that have come in contact with affected animals and also by birds, flies, vermin, etc. Ropes, buckets and utensils used for watering or feeding sick animals can also convey the disease.

Preventive Measures

To prevent its spread certain hygienic measures must be carried out. The first is the isolation of the affected animals. Next, the litter, droppings and other infected material should as far as possible be burnt. Material like ropes and buckets used for feeding and watering sick animals must be disinfected before use. Efforts should be made to prevent animals moving from place to place until such time as they can be "protected" by some biological methods. Another common precaution taken to prevent the spread of the disease from district to district is to place a "protective belt."

Protective Inoculations

After several years of veterinary research we now have methods at our disposal whereby we could immunise healthy animals against the disease. There are several well known methods by which this could be achieved, namely the "serum alone" method, the "serum simultaneous" method, the "vaccine" method and the "blood virus" method. By the first method it is the blood serum of an animal that has recovered that is given. Immunity is established at once but there is a drawback in that the period of immunity is short. It lasts for only about ten days. By the second method an animal is given serum as in the first instance and also vaccine at the same time. This double method of inoculating at the same time is to prevent by means of the serum any severe reactions that may be brought about by the dose of blood virus or vaccine. By the third method a vaccine made from an internal organ like the spleen is used. By the last method it is the blood drawn from an animal suffering from the disease, sufficiently attenuated, that is employed.

The necessary biologicals for the protection of cattle against rinderpest are made locally and cattle owners can have them for

the mere asking. And more, a Veterinary Surgeon will visit his bungalow or estate and carry out the inoculations free of charge. There biologicals are perfectly safe and they immunise an animal for a long time. According to the Director of Veterinary Services of His Exalted Highness the Nizam's Dominions, over two and a half lakhs of animals were inoculated against the disease in 1937-38 and the mortality was a little over a thousand animals. Gwalior State which has a cattle population of 45 million has now reduced the mortality rate to 10%. And finally, we have the case of Mysore State. In 1925-26 Mysore lost 34,228 animals from rinderpest. After the introduction of prophylactic inoculations the death rate was only 53 animals in 1935-36.

The Greatest Honor in Shepherd Craft

Condensed from the Sheep Breeder

Sydney Moorhouse, F. R. G. S.

Author and journalist who served with Britain's Royal Air Forces in India, Ceylon, and the Far East during World War II

REVIVED after a lapse of eight years, the International Sheepdog Trials have taken place recently at Edinburgh, that ancient and ever lovely capital of Scotland.

There, on a golf course a few miles out of the city, farmers and shepherds from England, Scotland and Wales brought the finest working dogs in the world—the famous Border Collies of legend and story—to compete for the greatest honor in the world of shepherd craft, that of being acclaimed Supreme Champion at the International Sheepdog Society's annual trials.

The road to such an honor is a long one. Throughout the summer sheepdog trials are held in country villages and rural areas in all parts of Britain and then, as the summer comes to its close, the best men and dogs of the three countries meet in their own national championships. From each of these the best 12 dogs go forward to the International match and there they compete for a trophy known as the International Farmers' Cup. Even this is but another stage in the long road to the greatest honor of all, for the best 12 dogs in the Farmers' Cup contest come together next day and, over a course which has no parallel for difficulty, do

Reprinted by permission from the Sheep Breeder, Chicago, Ill., February, 1947

battle for a trophy known as the "Blue Riband of the Heather."

Remembering this, is it to be wondered that men come from all parts of the world to watch these contests and make offers for the winning dogs? Indeed, the British shepherd's dog is known the world over for its efficiency and brilliance and before the war reigning champions were sold for as much as £100-£150 ($400-$600) to buyers from South Africa, Australia, New Zealand, and the United States.

Even the Japanese Government became interested and not only did they purchase some sheepdogs from Britain, but also paid quite substantial sums of money to Scottish handlers to go out and train them.

Not all champions, however, left Britain. Expert dogs are valuable for breeding purposes, as well as for trial's work, and consequently, the strain of the Border Collie—the breed used for this work—has been improved continually year after year. Indeed, experts point to a 30 per cent increase since the International Sheepdog contest began early in the century.

An eight years interlude meant that none of the dogs that competed in pre-war trials were running this year but their sons and daughters, nephews, nieces, and grandchildren— were and it was surprising how the characteristics of the forebears were inherent in a later stock. The English champion, Mac (owned by Mr. W. B. Bagshaw, whose dog, Glyn, did so much to popularize interest in sheepdog work by his part in the film "Owd Bob"), reminded me of his father, Mark Hayton's Pat, which did so well in pre-war International contests; John Thorp, a veteran handler from Derbyshire, had Jess II, which has many features reminiscent of her illustrious mother, Jess I, who won the Supreme Championship in 1931, and Joseph Ralph's Fleet (sheepdog hero of the film "Loyal Heart" now attracting large audiences) bears the stamp of her father, Fleet (owned by a Welchman, John Jones, another great dog in pre-war years.

With such promising dogs in view, it is not surprising that, despite current travel difficulties, there were men from overseas eagerly watching the contests at Edinburgh. I talked with an American who had spent several weeks in Britain and had already purchased several dogs; there were men from Canada and New Zealand watching, with eager eyes, the great work of both handlers and dogs.

Another overseas visitor was a Danish woman journalist, full of enthusiasm at witnessing what she told me was one of the most fascinating entertainments she had ever seen. The setting was,

of Course, typically Scottish and it seemed right that the rebirth of sheepdog trials, in which Scotsmen and Scottish dogs have played such an important part, should take place there. It seemed equally fitting that yet another Scottish victory should be registered there!

In the decade before the war the name of James M. Wilson, an Innerleithen farmer, had become almost synonymous with the very mention of sheepdog work. First winning the Supreme Championship in 1928, he followed up with four more victories before war caused a temporary stoppage in 1938. In that time he also won the Scottish championship seven times, gained victories at practically every important trial in his native land, and gave exhibitions before the Royal family at Balmoral Castle.

This time Wilson gave us one of the grandest of his many wonderful performances, handling a 2 years 8 months old dog, Glen, which had barely shaken off distemper in time to compete. In this event, 10 sheep have to be gathered from a spot 800 yards from the handler and brought toward him for 400 yards to a pole, passing through a gate on the way. Then the flock has to be left, while the dog dashes away to gather another ten sheep and bring them, through the gate, to join the first batch. The combined flock have then to be driven triangularly round a course, passing through another two gates, and then five marked sheep must be separated from the rest and driven into a six-feet square pen. The whole course, which entails some three miles of running as well as a deal of difficult technical work, has to be completed in 30 minutes.

To a softly spoken, "Where's the sheep, Glen?" the dog dashed away and made no mistake in gathering the first flock and bringing them to the pole. A whistle from Wilson and Glen had left them and was away for the second. The rest of the course was a pure delight to watch. Glen just trotted behind the sheep, never hurrying them, never pushing them hard, but just keeping them under perfect control and guiding them through the gates and back to Wilson as surely and certainly as though they were in some high-banked country lane.

Separating sheep often defeats many handlers, but Wilson is an old hand—and Glen a well-trained dog. Perfect coordination resulted in the sheep being penned and Wilson raising his cap to a crowd of 10,000 or so who cheered wildly at this grand exhibition of shepherd craft.

Wilson's ovation was typical of the interest now shown in sheepdog work. Such events hardly

come under the category of sport —nor are they exhibitions of trick working. Rather do they set out to reveal the ordinary everyday work performed by the shepherd and his dog.

The trial organized by the International Sheepdog Society is designed for the sole purpose of testing the capabilities of the collies for carrying out this work and because of this the Supreme Championship is the most coveted honor of the shepherd world, the striving for which has done more than anything else to instill a desire within sheepdog men to breed selectively.

This year, encouraged by the urgent need to introduce new blood into the working dogs of the British Commonwealth and other agricultural countries, interest in the Supreme Championship has been great. The presence of so many young dogs of quality revealed that the prowess of the British sheep dog breeder has in no way been impaired by wartime conditions.

Sulfathiazole for Bees

Sulfathiazole is good stuff for bees, too. The drug that has proved so successful in the treatment of certain diseases of humans has given good results in bee colonies for the control of American foulbrood.

Experiments with sulfa for the control of this No. 1 enemy to the bee industry were carried on last year by J. Peter Johnson, entomologist at the Connecticut Agricultural Experiment Station. They confirmed the promising results earlier obtained by researchers at the Missouri Station, who had initiated the work.

Mr. Johnson used eight colonies in the Connecticut experiments. Each was seriously infected with American foulbrood. Sulfathiazole was fed to the bees either dissolved in water or in a combination of sugar and water. The concentrations were always 0.5 gram of sulfa per gallon of liquid. Treatment was begun on June 6 and ended on October 22. The sulfathiazole was available to the bees at all times.

In all cases, decided improvement was noted. The sugar solution was evidently much more palatable to the bees than the plain water solution. All hives given the sulfa-water-sugar combination showed complete elimination of diseased brood in less than one season. While the disease was not checked completely in hives fed the water formula, favorable reaction, to some degree, was shown in every case. The greater success of the formula containing sugar was undoubtedly due to higher consumption by the bees.—*Connecticut Agricultural Experiment Station Report of Progress.*

How to Rid Your Farm of Rats

Condensed from the Pennsylvania Farmer

M. Glen Kirkpatrick

IF A farmer wants to get rid of rats, he can do something about it. I can't believe otherwise, in view of rat killing experiences I've seen and heard of in recent months. One farmer gathered up a wheelbarrow full of dead ones; another, two five-gallon pails full; another counted his dead rats and found there were 220; another counted 235—and so on.

Of course, a farmer can do a better job getting rid of rats if he knows what he is up against and how to proceed. So let's consider a few facts about the habits of rats.

Nests of rats are usually built in underground retreats, or in old strawstacks or fodder piles.

Rats migrate from farm to farm. They also migrate from barns and other buildings to the outdoors in spring and back again in the fall.

Rats eat shortly after dark, then again early in the morning. The young rats are first to eat—presumably because they have not learned the caution of their elders. Flash your light on a feeding place just after dusk and you may see a bunch of young rats which do not seem to be startled; turn it on again later and you may see the big ones scramble to get away.

Because rats are most active at night, some farmers may not realize how many they have. There are always telltale signs when rats are present, however—dirt worked out from under the corn crib floor, rat droppings in cribs and feed bins, rat holes around feeding floors, junk and trash piles and so on.

Harold Gunderson, Iowa State College, has worked out a plan for estimating the number of rats on a farm. Here it is:

If rats are never seen but rat signs are visible, you have from one to 100 rats.

If rats are seen occasionally at night, you have from 100 to 500.

If rats are seen every night and occasionally during the day, the total may range from 500 to 1,000.

If lots of rats are seen at night and several every day, the total number on the farm is between 1,000 and 5,000.

One of the best ways to keep rats in check and lessen rat damage is have farm buildings rat-proof, so rats can't get in. Bins and cribs can be covered inside

Reprinted by permission from the Pennsylvania Farmer, Pittsburgh, Pa.

or out with half-inch mesh hardware cloth—but, of course, this is costly. The purpose of rat-proofing is to keep rats away from the feed supply. They stay only where they can get food.

Concrete floors and foundations are good protection against rat damage. These represent good building procedure, rats or no rats. New buildings should be built rat-proof; old ones can easily be made so at a reasonable cost.

In frame buildings, foundation walls of concrete should go at least two feet below ground level to keep rats from burrowing under. If the foundation is low, space above sill and between studs can be filled with concrete up to height of two feet. A concrete floor 4 inches thick (thicker if heavy vehicles use it),put down properly, completes the rat-proofing job.

Cribs or other buildings that rest on posts should be at least 18 inches above the ground to allow good lighting beneath the floor. Rats won't stay long where there is plenty of light. Don't lay wooden crib floors on 2x4's or 2x6's placed on the ground.

To keep rats from climbing foundation posts beneath buildings tack a strip of tin around each post, so the edge of the tin will extend out three or four inches from the post. Some farmers use glazed sewer tiles for supports and turn an old dishpan upside down over the upper end of each tile before putting sills on the supports.

Where pipes enter buildings, flash the openings around the pipes with sheet metal to keep rats out. Ventilation intakes can be covered with half-inch hardware cloth.

The farms that have the most rats are usually the ones that have the most junk lying around. Piles of trash, lumber, fence posts or poles lying on the ground are an invitation to rats. As often as not these piles are alongside or close to the crib or granary, where they constitute a fire hazard as well as a rat harbor. Place lumber and post piles, feeding racks, wagon boxes, hay racks, etc., on racks at least 24 inches from the ground and away from cribs.

Old stack bottoms and fodder piles are a haven of refuge for rats. Clean up old strawstacks every year—and the same for fodder and manure piles. Clean unused silage from the bottom of empty silos.

A pile of discarded farm implements or implement parts provides shelter for rats. Take up and sell worthless machinery for junk and store parts that are worth keeping for repairs or replacements.

Keep weeds cut around farm buildings. In summer months

rats make their burrows in weedy patches outdoors, particularly in poultry yards, along feedlot fences and near buildings where feed is stored.

In rat control, any method is good that does a good job. Trapping, gassing and shooting all have their good points, but poisoning is the most practical and efficient way to get rid of rats. Poisoning is the method recommended most widely by rat control specialists.

Some folks object to poisons because of danger to livestock, poultry, pets and humans. This objection is overcome by using the right poison and distributing it carefully. A good poison is one that is tasteless, effective, and relatively non-poisonous to other animals and humans. Success in poisoning depends largely on the poison used, the bait employed and the manner of mixing and placing baits.

Squill is widely used in rat-killing preparations. Safety is its principal advantage. It is relatively harmless to human beings and domestic animals. A lot of farmers want something more effective against rats, however. Rats can detect squill in baits, and the ones not killed by their first dose are not likely to take it again.

A highly effective rat killer is the new material announced by the U. S. Fish and Wild Life Service and known generally as 1080. This killer is so deadly to other forms of life as well as to rats, that it is safe only in the hands of professional exterminators.

Another new rat-killing chemical with numerous advantages is antu (a "quickie" for its chemical name, alpha-naphthyl-thiourea). Antu was discovered at Johns Hopkins Hospital by Dr. C. P. Richter while using a closely related chemical to conduct laboratory studies in self-selection of diets.

Antu is fairly specific against the common brown rat. It is reasonably safe to humans. It is not poisonous to grass-eating animals. It is somewhat poisonous to hogs, dogs and cats, but is not dangerous to these animals or to chickens if baits are properly prepared and placed. It is tasteless to rats; they can not detect it in baits. Also, it is an effective tracking poison; that is, when it is dusted down burrows or on surfaces where they travel or congregate, rats will get a killing dose from stepping in it and licking their feet.

Straight antu is available only to professional exterminators. For general use, it is available in commercial rat-killing preparations. Several are already on the market. By combining antu with a suitable base, it is possible to produce a carefully balanced rat

killer which is plenty toxic to rats, and at the same time less toxic to other animals.

Baits suitable for use with rat killing poisons are usually the things that rats are feeding on. Some farmers have best results same time. Rats that have all the using several kinds of bait at the grain they want around the crib or barn may go for a change of diet.

Some of the good baits are chopped lean meat, sausage, fish, liver, bacon, canned dog food, egg, apple, tomato, melon grind, mashed sweet potato, banana, cheese, ground cereals, peanut butter, sweet corn, fresh blood and milk.

With baits of fruit or vegetables the rat-killing preparation, if a powder, can be dusted over the diced or sliced pieces of bait. Likewise, chicken heads, fish heads, bacon rinds, or bits of bread saturated with bacon grease, can be dusted.

Place baits in sheltered places. Rats like darkness. No matter what poison you are using, do not place baits where cats, dogs, chickens or other animals can get at them. If there is no easy way to keep animals and pets away, use a bait box with cover that can be securely fastened. Cut a hole for rats in each end and put the bait inside.

Put the bait box in a dark corner of the barn or under the edge of a trash pile back of the corn crib, or back of some feed bags in the feed room, or beneath a feed bunk in the feed lot. Protect the bait box from larger animals—otherwise they may tramp it and expose the bait to pets, poultry or livestock.

To keep your farm free of rats it is necessary to repeat the rat killing efforts every so often. Otherwise, if the farm offers shelter and food for rats, they will move in again from neighboring farms where rats abound.

Because rats migrate from farm to farm, community action is highly desirable in getting rid of rats. Your neighbor's rats may be yours tomorrow. A Rat Killing week or a Dead Rat Day can be put on by Farm Bureaus, Granges, FFA chapters, 4-H Clubs, and other farm groups. In this way it is possible to enlist farms on a community-wide or county-wide basis.

Warrin' on Weeds

Condensed from The Western Farm Life

Rafe Gibbs

THERE along the banks of the canal—was the entrenched enemy. The squad leader of the invading force, sizing up the situation from his vantage point within an amphibian tractor, called for a flame thrower.

Seconds later, long tongues of blazing death licked the canal bank. Then came the report: "All wiped out."

The scene was not Iwo Jima, but a Colorado river basin irrigation project. The enemy was weeds—just weeds, but still the most costly peacetime foe of American farmers. The amphibian tractor and flame thrower were real enough. They had served in the Pacific against the Japs. And it was war, all right—war declared by the United States Bureau of Reclamation against weeds in reclamation areas of the west.

Beach storming amphibian tractors and flame throwers, plus war developed chemicals, are the latest weapons to be used against weeds.

The sea-going tractors—called "Water Buffaloes" by former GI's—are sent churning through canals, across streams and lakes. They go where boats and other vehicles find it difficult or impossible to explore. Their principal mission in this peacetime war is to aid in clearing areas of tules and cattails.

With tanks strapped to backs, flame thrower operators walk along the ditchbanks, withering weeds down to the water line. Large, machine-operated flame throwing equipment is also being utilized.

Then there are such war developed chemicals as chlorinated hydrocarbon, water-borne destroyer of channel weeds, which are being called into action.

The full potentialities of the war weapons in fighting weeds have not yet been explored, but the tests conducted thus far hold out great promise. And winning this battle is highly important.

"Weeds cost the farmer more money every year than all crop and animal plagues, insects, predatory animals and rodents combined," declares bureau of reclamation agronomist R. B. Balcom. "An estimate taken before the war placed the cost of weeds to the average farm at around $450 a year."

During World War II, control work was gravely hampered in

most areas as the man with the hoe became the man with the gun or riveting machine. As a result, weed losses have reached an all-time high in the nation.

To cut down these losses in the West's vast irrigation projects, agencies of the department of agriculture, local weed districts, and project settlers have joined forces in organizing a comprehensive weed control program.

Agronomist Balcom explained that "while non-irrigated fields are plentifully filled with weeds, irrigated fields play host to them all. They are perfect made-to-order weed beds."

Under irrigation, there are no dry periods to stymie weed growth. In the warm, damp ground of irrigated areas, weeds flourish all through the growing season, producing bumper crops of new weeds. The seeds not only grow in the parent field, stunting paying crops, but frequently spread to neighboring fields by way of irrigation ditches and become undesirable squatters.

Back in the days of roving Indians and buffaloes, the West had plenty of its own weeds. But unthinking settlers from the East and Midwest brought more. Tucked in the beds of covered wagons were crop seeds that generally had not been cleaned and were heavily contaminated with weed seeds. The weed seeds liked the western climate and soil, stayed and thrived.

For many generations, the individual farmer has been keeping himself and his pocketbook thin in fighting weeds. It has only been within the past 10 years that he has received extensive organized help or advice. Previously, it was not considered economically sound to combat weeds on a large scale. The weed menace was like the weather to Mark Twain—everybody talked about it, but nobody ever did anything about it.

Now the western farmers will receive aid on a big scale. Actual weed work on farms will be carried on by the farmer himself, local weed districts and by participating state and county agencies.

The bureau of reclamation, however, will conduct surveys and tests to analyze the weed problem, particularly on new irrigation projects such as the 1,000,000-acre development in th Columbia basin of southeastern Washington. The bureau will determine control tactics and lay out prevention campaigns. It will cooperate with all interested agencies in an educational program by providing slide and filmstrip lectures, color sound films, advice at farm meetings and by participation in weed tours.

The bureau is going to put its own army of experts on the front

lines in the battle against ditchbank and channel weeds that clog up canals and smaller ditches, stop drains and in general sabotage farm activities.

Use of war weapons in this phase of the attack on weeds typifies the zeal with which farmers and agencies are going after weeds.

No matter what weapons are used, however, the weed war is on—to the finish.

Lovegrass in the Windy West

Condensed from Soil Conservation

Clarence Bunch

HENRY WADLEY, Negro farmer of Geary, Okla., planted weeping lovegrass on his hands and knees with a pepper shaker in a prepared plot 128 feet long and 36 feet wide. Wadley knew that people would think him crazy if they saw him going through such queer maneuvers; so he prepared the experimental plot where he thought he would be concealed from view by trees and shrubs. But he was seen anyway, and word got around. There were those who did wonder if Wadley might not be a little "touched."

Wadley laughs about it now. That little plot of weeping lovegrass showed him how he could save his farm from wind erosion. He planted it with a handful of seed received from the Soil Conservation Service. That was 3 years ago, shortly after he had become a cooperator with the Central North Canadian Soil Conservation District. Like many another farmer of the area, Wadley had been losing topsoil through wind erosion. When exposed, the light, sandy soil of this part of Oklahoma is peeled off and blown away by the wind that comes with certainty every spring and occasionally at other times. Productivity of the farm had declined to a low level, but a coordinated soil conservation program now has brought his land back to a paying basis in three years.

In addition to tieing his land down with weeping lovegrass, Wadley uses crop and pasture rotations, grows soil-improving crops and strip crops. He planted a windbreak. To round out his coordinated program, Wadley still has a few moves to make, one of which is to provide water facilities for his cattle.

Reprinted from Soil Conservation, Washington, D. C., March, 1947

But it's the weeping lovegrass about which Wadley most likes to talk.

"That little plot of land that I planted with a pepper shaker put me in the lovegrass business and I'm in it to stay," he says. "That's the only thing to stop the blowing of soil around here. It's a hardy plant, this lovegrass, good for our sandy soil, able to get along in hot or cold weather. It stops erosion.

"Lovegrass makes good grazing, cattle like it. In the fall and winter my cattle walk over wheat to graze the lovegrass. It's the first grass out in the spring—it gets green in February—and it stays green even through hot, dry summers. If snow doesn't cover the ground, I can pasture it all the year around. Of course I have to give my cattle some supplemental feed in the winter, usually a pound of cotton meal cake per head daily for 3 months, November to February."

When Wadley saw what the weeping lovegrass did in his little plot, he paid $90 for a small sack of seed (the price has ranged from $5 to $8 a pound). When told what the sack cost, his wife exclaimed: "My land, what's in there, gold?"

"I told her it was as good as gold," Wadley answered.

Wadley planted one-third pound of seed per acre. He now has 45 acres in weeping lovegrass. The past summer he had a herd of 30 head of Hereford cattle, a herd built up from 1 cow bought when he married in 1928. He now has his own registered bull. In midsummer he marketed 10 calves at an average price of $87 each.

About the first of August, last year, Wadley put his 30 head of cattle in a 30-acre field of weeping lovegrass. If snow does not bury the field, the cattle will be kept on this pasture through the winter, he said. The cattle graze the lovegrass until noon each day, then go a mile for water, remain in the shade near the water and graze a nearby 16-acre field of sudan grass in the afternoon.

In 1946 Wadley harvested seed from that first little plot of weeping lovegrass for the first time. He got 28 pounds. He harvested 252 pounds of clean seed from 16 acres of a 30-acre field of weeping lovegrass, although he could not get a combine in time for the best yield, and he had 2 tons of hay after threshing the seed.

Wadley planted his larger field of lovegrass with a drill owned by the Central North Canadian Soil Conservation District. He declared that he could not get along without assistance from the district.

Wadley and his neighbors planted approximately 50 acres in lovegrass last fall, but the best planting time for weeping love-

grass in this area is from April 10 to May 10. In about 6 weeks the lovegrass will be up enough to protect the soil against wind erosion. Until it gets this high the lovegrass itself must be protected against the wind. Shallow listing is one way to do this. When the grass comes up, weeds must be controlled and grazing should be held off until the second year of growth. The small amount of labor involved will be well repaid, for weeping lovegrass, in a coordinated soil conservation program, not only holds the soil against blowing, but provides excellent pasture and hay, conditions the soil with a deep-root system, and serves as a cash crop through the sale of seed.

Wadley was born on the farm which he is now restoring to productivity through a coordinated soil conservation program. His father homesteaded the farm and enlarged it through purchase.

"In the beginning my father used to get 35 bushels of wheat to the acre and 50 bushels of corn," Wadley said. "Wind and some water erosion gradually cut that down. When I became a district cooperator 3 years ago, wheat and corn production was down to 7 or 8 bushels an acre. The farm was scarcely paying its way. Father didn't know what was happening or what to do about it. But I do, thanks to my soil conservation program. I have two boys coming along and I'm going to leave them a farm they can be proud of."

Wadley has a diversified farm of 320 acres. Besides his cattle, he has corn, sorghum, cotton, peas, a woodland, pigs, and chickens. The sale of eggs and cream brings in a steady weekly income. The woodland provides fence posts and fuel. Other crops augment the cash income from his basic beef cattle enterprise. His farming methods have won the interest and respect of his community. The Agricultural Improvement Association honored him by electing him president. This association is an organization of Negro farmers living around Endora who are all wrapped up in the new farming ideas which hold so much hope for agriculture in the windy West.

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean, School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $3.50.

Breeds of Livestock in America—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State College. College Book Co. $4.75.

Dairy Cattle Feeding and Management—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.50.

Dairy Science—By W. E. Petersen, Ph.D., Assoc. Prof. Dairy Husbandry, Univ. of Minn. By R. W. Gregory. J. B. Lippincott Co. $4.00.

Diseases and Parasites of Poultry — By Edgar Hugh Barger, D. V. M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition. $3.75.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.50.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $6.00.

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. $3.50.

Grow Your Own Fruit—By M. G. Kains, formerly U. S. Dept. of Agri.; Prof. of Horticulture, Penna. State College. Greenberg, Publisher. $3.50.

Livestock Judging Handbook — By Julius E. Nordby and W. Malcolm Beeson, Ph.D., Asst. Professors Animal Husb., Univ. Idaho. The interstate Printers. $3.25.

Making Pigeons Pay—By Wendell M. Levi, formerly Pigeon Section, U.S.D.A. Signal Corps. Orange Judd Publishing Co., Inc. (1946). $2.50

Modern Agricultural Mathematics—By Maurice Nadler, B. S., A. M., Dept. of Mathematics, Newtown High School, Long Island. Orange Judd Publishing Co., Inc. $2.00.

Natural Principles of Land Use—By Edw. H. Graham, Chief of Biology Div., Soil Conservation Service. Oxford University Press. $3.50.

Onion Production—By Donald Comin, Ass't Horticulturist, Ohio State Exp. Station. Orange Judd Publishing Co., Inc. (1946). $2.00.

Pay Dirt—Farming and Gardening with Composts — By J. I. Rodale. Devin-Adair Co. (1945). $3.00.

Practical Farming for the South — By Benjamin F. Bullock, now Prof. Rural Education, Atlanta Univ. Univ. of North Carolina Press. $2.50.

Profitable Poultry Keeping—By H. Clyde Knandel, Head, Dept. Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

Repairing Farm Machinery—By Ivan G. Morrison, Asst. Professor Agri. Education, Purdue Univ. The Interstate Printers & Publishers. $2.25.

Successful Poultry Management—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.50.

For the convenience of our readers, books listed may be purchased through this Department. Address Farmers Digest, Ambler, Pa.

AMONG THE NEW BOOKS

RAISING LIVESTOCK—by Walter H. Peters, Chief, National Division of Animal and Poultry Husbandry, University of Minnesota; and George P. Deyoe, Professor of Education, Michigan State College.

"Raising Livestock" presents the important phases of the livestock business, with step-by-step directions on how to perform the jobs that need to be done. Specific suggestions are easy to find for solving problems in producing, handling and managing swine, dairy cattle, beef cattle, sheep, horses, and mules. Practices of value in selecting, improving, breeding, feeding, housing, and maintaining the health of livestock are presented. This book is designed for the use of prospective and present farmers and ranchers. 240 illustrations amply supplement this practical book.

Publishers: McGraw-Hill Book Co., Inc. 536 pages. 1947. $3.50

DOMESTIC GEESE AND DUCKS—by Paul P. Ives, President, American Waterfowl Association; Elitor, Cackle and Crow.

This new book, especially written for the agricultural student and practical breeder, tells how to make a start in the raising of geese and ducks, how to handle breeding stock, discusses the size of matings, the production of eggs, the care, feeding, growing and fattening, and marketing of young stock. The book is well illustrated with full page drawings and illustrations from actual photographs. "Domestic Geese and Ducks" is an excellent handbook for every day use.

Publishers: Orange Judd Publishing Co., Inc. 372 pages. 1947. $3.50

BOVINE MASTITIS—A Symposium—Edited by **Ralph B. Little,** Department of Animal and Plant Pathology, The Rockefeller Institute for Medical Research, and **Wayne N. Plastridge,** Department of Animal Diseases, University of Connecticut, Storrs, Conn.

In this important new book a group of recognized experts present a scientific treatment of bovine mastitis to give an all-over picture of the disease as it occurs naturally, and of the advances that have been made in its study. It is intended as a textbook for veterinary schools, and as a valuable reference book for practicing veterinarians, dairymen, research workers.

Mastitis is probably the most acute problem which faces the present-day dairyman. The book, BOVINE MASTITIS, gives a vivid description of the development, anatomy, and physiology of the udder. It deals effectively with the factors causing mastitis, with its diagnosis, its various forms, transmission, and the various curative methods and their effectiveness to date. The book is technical but readable.

Publisher: McGraw-Hill Book Company (1946). $7.00

INDEX

Beef Cattle

Hidden Value in Grass-Fed Beef . . May, 1946
Ranch Animals May Be Starving . . . May, 1946
Brahman Cattle in the South . . . May, 1946
Importance of Being a Good Judge June, 1946
Screwworm . . . June, 1946
Research for Better Beef Production July, 1946
New Way To Market Meat . . . July, 1946
Salt Is Must for Stock Raising . . July, 1946
What Constitutes Nicking? . Aug.-Sept., 1946
Livestock Thrives on Moldy Corn, Aug.-Sept., 1946
What It Takes to Succeed as a Breeder, Oct., 1946
Livestock Assembly Line . . . . . Dec., 1946
Beef from Less Corn . . . . . Dec., 1946
Production or Reproduction . . . . . Dec., 1946
Shipping Fever . . . . . Jan., 1947
Livestock Production . . . . . Feb., 1947
Heredity and Prepotency . . . . . Feb., 1947

Conservation

The French Don't Dare Wear Out Their Farms . . . . . May, 1946
There's But One Way To Do the Job May, 1946
Mapping the Land According to Capability, June, 1946
Earthworms Fight Erosion . . Aug.-Sept., 1946
We Took the Job Out to the Land . . Dec., 1946
Introducing InLac . . . . . Jan., 1947
Nature's Mighty Plowman . . . . . Jan., 1947
New Outlets for Farm Products . . . Feb., 1947
St. Joseph Helps the Farmer . . . . Feb., 1947

Crops

The Popularity of Sweet Sudan . . . July, 1946
A Bow to Brome . . . . . Aug.-Sept., 1946
Costly to Plow Corn Deep . . Aug.-Sept., 1946
Uses of Sunflower Seed . . . . . Oct., 1946
Alfalfa: Queen of Forage Plants . . . . Oct., 1946
Corncobs Do New Job Well . . . . . Oct., 1946
Madrid Sweet Clover . . . . . Oct., 1946
Subterranean Clover Comes to American Fields, Dec., 1946
That New Oat Disease . . . . . Dec., 1946
The New Sweetclovers . . . . . Jan., 1947
Mammoth or Medium Red Clover . . Jan., 1947
New Uses for Cotton . . . . . Jan., 1947
Growing Legumes on Acid Soil . . . . Jan., 1947
Bur Clover Comes Into Its Own . . . Feb., 1947
Rice Growers Dry Their Boots . . . . Feb., 1947
He Grows $1,000 on Each Acre . . . . Feb., 1947
Calves Solve a Problem . . . . . Mar., 1947
Rose Farmers . . . . . Mar., 1947

Dairy Cattle

Homogenization—the Milk Salesman May, 1946
High-Fat Dairy Rations Give Higher Milk Production . . . . . May, 1946
Calf Weight Studies . . . . . May, 1946
Wilting Grass for Silage . . . . . June, 1946
Sunlight Reduces B-2 Milk Value July, 1946
Why Some Cows Can be Profitable June, 1946
Ketosis in Dairy Cattle . . . . . July, 1946
Cause and Treatment for Bloat . . July, 1946
Soil Deficiences and Disease . . . . . July, 1946
Mastitis Program . . . . . July, 1946
Modern Trends with Dairy Herds July, 1946
More Milk Dollars from Cross-Breds, Aug.-Sept., 1946
Dry Milk Has a Future . . . . . Aug.-Sept., 1946
Predicting Production in Heifers, Aug.-Sept., 1946
Spring Freshening Cows—More Milk, Aug.-Sept., 1946
Preparing Calf for Show Ring Aug.-Sept., 1946
Flavor in Milk . . . . . Oct., 1946
Out on First Record . . . . . Oct., 1946
Learning More About Cows . . . . . Dec., 1946
Cooling Milk for Keeping Quality Dec., 1946
What's Skimmilk Worth . . . . . Dec., 1946
Dairy Calves Need Good Feed and Care, Jan., 1947
Reducing Cost of Milk Production . . Jan., 1947
What It Takes to Feed a Cow . . . . . Jan., 1947
Practical Feeding for Milk Production, Feb., 1947
Calves Solve a Problem . . . . . Mar., 1947
Selecting Your Herd Sire . . . . . Mar., 1947

Farm Machinery

Safeguarding Power Farm Machinery Dec., 1945
The Speed Sprayer . . . . . Aug.-Sept., 1946
Taking the Sweat Out of Farming . . Feb., 1946
Rust—Saboteur of Machinery . . . . . May, 1946
Less Time in the Corn Field . . . . . June, 1946
Tending Lights and Starter . . . . . July, 1946
Post War Machinery for the Fruit Grower, Dec., 1946
Farm-Size Crop Driers . . . . . Jan., 1947
Air-Minded Farmers . . . . . Jan., 1947

Fruit

Try Strawberries . . . . . Mar., 1946
Income out of Orchard Waste . . . . April, 1946
Blueberry Growing . . . . . June, 1946
The Blackberry—A Neglected Fruit July, 1946
The Trees Can Tell You . . . . . July, 1946
Creeping Trees of Siberia . . . . . July, 1946
Ask the Trees . . . . . Aug.-Sept., 1946
The Romance of the Fig . . . . Aug.-Sept., 1946
Soil Management—Its Influence on Apple Tree Roots . . . . . Oct., 1946
Zinc Coated Nails Check "Little Leaf," Oct., 1946
The Fruit Garden . . . . . Jan., 1947
New Life for an Old Vine . . . . . Feb., 1947
Fighting Frost with Ice . . . . . Mar., 1947

Fertilizers

Nitrogen to Increase Corn . . . . . Jan., 1946
Soil Fertility and Trace Elements . . Jan., 1946
Leaf Analyses Show Needs . . . . . Jan., 1946
Ammonia Gas Is Soil Fertilizer . . . Oct., 1946
Manure—Valuable Soil Builder . . . . Feb., 1946
Bigger Crops at a Profit . . . . . Feb., 1946
New Life for Wornout Land . . . . . May, 1946
Function of Organic Matter in the Soil, May, 1946
Old and New Fertilizers . . . . . June, 1946
Production of Mulch Material . . . . June, 1946
B Vitamins from Cow Manure . . . . June, 1946
Phosphates in Their Working Clothes, Aug.-Sept., 1946
The Farmer's Wood Bank . . . . . Oct., 1946

INDEX

Fertilizing for Yield and Soil Improvement, Dec., 1946
Fertility in a Hurry ..... Dec., 1946
Fertilizer Nitrogen from Various Sources, Mar., 1947

Production Records Vital to Improvement, Mar., 1946
Blower Mows Away Long Hay ..... May, 1946
Brown Hay ..... June, 1946
An Easy Way to Move Hay ..... Oct., 1946
Hay for Sale ..... Dec., 1946

Vary the Protein Content of Swine Rations, Dec., 1946
Alfalfa Decreases Pig Death Losses ..... Jan., 1947
Breeding Season Management ..... Jan., 1947
Increasing Pork by Decreasing Loss ..... Feb., 1947
Swine Nutrition ..... Mar., 1947
Plan Ahead for a Profitable Pig Crop, Mar., 1947

A Control for "Moon Blindness" ..... April, 1946
To Make Money on Race Horses—Raise Them ..... Oct., 1946
The Pinto Horse ..... Dec., 1946

Fewer Flies—More Beef ..... Aug.-Sept., 1946
New Fumigant Controls Greenhouse Pest, Aug.-Sept., 1946
Fly Control ..... Oct., 1946
Device Sprays 2,500 Sheep an Hour ..... Oct., 1946
Grass Spray ..... Oct., 1946
Animal d-Ter—Insect Repellant ..... Oct., 1946
What DDT Does for Legumes ..... Dec., 1946
DDT Dust Controls Chinch Bugs ..... Jan., 1947
Fermate to Control Blue Mold ..... Jan., 1947
No More Bugs to Bother Them ..... Feb., 1947

"Train" Your Bees ..... Oct., 1946
New Life for Old Pastures ..... Feb., 1947

Old Riddle Solved ..... Dec., 1946

How I Fitted My Lambs for Chicago ..... May, 1946
Shepherd Sunday on Switzerland's Belalp, July, 1946
Better Poultry Meat ..... Oct., 1946
High Egg Yields Depend on Heavy Feed Intake ..... Oct., 1946
How to Reduce BBB Replacement Costs, Dec., 1946
The Great American Bird ..... Dec., 1946
Eggs When You Want Them ..... Dec., 1946
Factor in Cow Manure Stimulates Growth, Dec., 1946
Simplified Pedigree Breeding ..... Jan., 1947
Extra Feed Makes the Eggs ..... Jan., 1947
Keep Cost Low—Efficiency High ..... Jan., 1947
Sulfamerazine Controls Coccidiosis ..... Jan., 1947
Handling Poultry Manure ..... Jan., 1947
Better Hatching Eggs ..... Feb., 1947
Producing More Profitable Poults ..... Feb., 1947
Dry Land Duck Farming ..... Feb., 1947
Radiant Heat for Brooding ..... Mar., 1947
Pullets Pay Better ..... Mar., 1947
Add to Profits with Capons ..... Mar., 1947

More Profitable Sheep ..... Oct., 1946
Device Sprays 2,500 Sheep an Hour ..... Oct., 1946
How a Sheep Herder Ranges His Sheep, Nov., 1946
Hand-Picked Sheep Boost Wool Yield, Feb., 1947
Feeding Ewes to Prevent Pregnancy Disease, Mar., 1947

By Benefit of Bacteria ..... Jan., 1947
Ammonia Gas is Soil Fertilizer ..... Jan., 1947
Soil Structure is Key to Yield ..... Jan., 1947
Solving Secrets of the Soil ..... Mar., 1947

Sugar Bush Pays Off ..... Mar., 1946
Sweeter Sap ..... Mar., 1946
Wayne County Shows the Way ..... Aug.-Sept., 1946
This Farm Wood Earns Cash ..... Jan., 1947
Harvesting the Timber Crop ..... Feb., 1947
Direct Seeding Tool ..... Mar., 1947

Eradication of Japanese Honeysuckle, Aug.-Sept., 1946
Killing Weed Seeds ..... Oct., 1946
Cashing in on Weeds ..... Mar., 1947
Kochia—The Weed That's Feed ..... Mar., 1947

Mung Beans—Farming in a Cellar ..... Mar., 1946
New Wrinkles for Potato Growers ..... April, 1946
Wingard's Wonder Bean ..... April, 1946
More Vegetables for Less Money ..... April, 1946
Prevents Spud Sprouts ..... April, 1946
Salt Increases Beet Yield ..... May, 1946
Vegetable Cows ..... July, 1946
Hybrid Vegetables ..... Aug.-Sept., 1946
Hormone Magic for Tomatoes ..... Aug.-Sept., 1946
Electricity Speeds Tomato Production, Dec., 1946
Checking Irish Potato Sprouts ..... Dec., 1946
Blight Threatens Entire Tomato Industry, Feb., 1947
Film Wrapped Corn Stays Fresh ..... Mar., 1947
Seed Growing—New American Industry, Mar., 1947

Low Roads and High Roads ..... Oct., 1946
Sheep Dog Trials ..... Oct., 1946
Desolation Not For Sale ..... Oct., 1946
Fighting Prairie Fires ..... Oct., 1946
"Balanced Farming" Comes to Kansas, Dec., 1946
They Plow Trees Under ..... Jan., 1947
Latest Roundup on Hormone Feeding, Feb., 1947
Old Pokey ..... Feb., 1947
Management Program Controls Starlings, Feb., 1947
Pen Barns Have Certain Advantages ..... Feb., 1947
Farewell to the Haymow ..... Mar., 1947
Permanent Fencing for the Farm ..... Mar., 1947
Farmers Can Take It ..... Mar., 1947
Federal Crop Insurance ..... Mar., 1947
Profit Sharing with Farm Workers ..... Mar., 1947
New Pinkeye Treatment ..... Mar., 1947

In these times it is important that every citizen recognize the need for intelligent participation in public affairs, and we may well bear in mind Herbert Spencer's remark:

"What I need to remember is, how infinitesimal is the importance of anything I can do, but how infinitely important it is that I should do it."